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# **BART IMPACTS ON TRAVEL BY ETHNIC MINORITIES**

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**working paper**

The BART Impact Program is a comprehensive, policy-oriented study and evaluation of the impacts of the San Francisco Bay Area's new rapid transit system (BART).

The program is being conducted by the Metropolitan Transportation Commission, a nine-county regional agency established by state law in 1970.

The program is financed by the U. S. Department of Transportation, the U. S. Department of Housing and Urban Development, and the California Department of Transportation. Management of the Federally funded portion of the program is vested in the U. S. Department of Transportation.

The BART Impact Program covers the entire range of potential rapid transit impacts, including impacts on traffic flow, travel behavior, land use and urban development, the environment, the regional economy, social institutions and life styles, and public policy. The incidence of these impacts on population groups, local areas, and economic sectors will be measured and analyzed. Finally, the findings will be interpreted with regard to their implications for the planning of transportation and urban development in the Bay Area and other metropolitan areas.

BART IMPACT PROGRAM  
BART IMPACTS ON TRAVEL  
BY ETHNIC MINORITIES



NOVEMBER, 1977

WORKING PAPER

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PREPARED FOR  
U.S. DEPARTMENT OF TRANSPORTATION  
AND  
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT  
WASHINGTON, D.C.

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PREPARED BY  
**JEFFERSON ASSOCIATES, INC.**

**PEAT, MARWICK, MITCHELL & CO.**

UNDER CONTRACT WITH THE  
**METROPOLITAN TRANSPORTATION COMMISSION**

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**U.S. DEPARTMENT OF TRANSPORTATION**

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16. Abstract  BART, the 71-mile Bay Area Rapid Transit System, serving San Francisco Oakland, Berkeley, and their suburbs, is the first regional-scale rapid transit system to open in the United States in over 50 years. This report is one of a series assessing the impacts of BART on transportation and travel in the Bay Area.  This report assesses BART's impacts on travel by ethnic minorities by analyzing data from (1) conventional large-scale travel surveys and (2) special "field station" data collection efforts conducted by participant observers in ethnic minority communities. The latter were conducted in the predominantly Spanish-heritage Mission District of San Francisco and the predominantly Black city of Richmond.  Minorities use BART rather less than suggested by their representation in the total population of the area served. Most minority BART riders are young, well-educated and have relatively high incomes, and like the white majority ridership, travel largely to central city destinations. Low-income disadvantaged minorities use the system little.			
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## PREFACE

This report describes analyses undertaken as part of the Transportation System and Travel Behavior (TS&TB) Project of the BART Impact Program. The report was prepared by the staff of Jefferson Associates, Inc. as subcontractors to Peat, Marwick, Mitchell & Co.

The report extends analyses of BART impacts on travel by minorities reported in earlier TS&TB Project reports.

Transportation and Travel Impacts of BART:  
Interim Service Findings, BART Impact Program  
Document No. Fr 6-3-75, Peat, Marwick,  
Mitchell & Co., April 1976.

Travel in the BART Service Area, BART Impact  
Program Document No. WP 35-3-77, Peat,  
Marwick, Mitchell & Co., September 1977.





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- BART:** The Bay Area Rapid Transit System
- Length:** The 71-mile system includes 20 miles of subway, 24 miles on elevated structures and 27 miles at ground level. The subway sections are in San Francisco, Berkeley, downtown Oakland, the Berkeley Hills Tunnel and the Transbay Tube.
- Stations:** The 34 stations include 13 elevated, 14 subway and 7 at ground level. They are spaced at an average distance of 2.1 miles: stations in the downtowns are less than one-half mile apart, while those in suburban areas are two to four miles apart. Parking lots at 23 stations have a total of 20,200 spaces. There is a fee (25 cents) at only one of the parking lots. BART and local agencies provide bus service to all stations.
- Trains:** Trains are from 3 to 10 cars long. Each car is 70 feet long and has 72 seats. Top speed in normal operations is 70 mph with an average speed of 38 mph including station stops. All trains stop at all stations on the route.
- Automation:** Trains are automatically controlled by the central computer at BART headquarters. A train operator on board each train can override automatic controls in an emergency.
- Magnetically encoded tickets with values up to \$20 are issued by vending machines. Automated fare gates at each station compute the appropriate fare and deduct it from the ticket value.
- Fares:** Fares range from 25 cents to \$1.45, depending upon trip length. Discount fares are available to the physically handicapped, children 12 and under, and persons 65 and over.
- Service:** BART serves the counties of Alameda, Contra Costa and San Francisco, which have a combined population of 2.4 million. The system was opened in five stages, from September 1972 to September 1974. The last section to open was the Transbay Tube linking Oakland and the East Bay with San Francisco and the West Bay.
- Routes are identified by the terminal stations: Daly City in the West Bay, Richmond, Concord and Fremont in the East Bay. Trains operate from 6:00 a.m. to midnight on weekdays, every 12 minutes during the daytime on three routes: Concord-Daly City, Fremont-Daly City, Richmond-Fremont. This results in 6-minute train frequencies in San Francisco, downtown Oakland and the Fremont line where routes converge. In the evening, trains are dispatched every 20 minutes on only the Richmond-Fremont and Concord-Daly City routes. Service is provided on Saturdays from 9 a.m. to midnight at 15-minute intervals. Future service will include a Richmond-Daly City route and Sunday service.\* Trains will operate every six minutes on all routes during the peak periods of travel.
- Patronage:** Approximately 146,000 one-way trips are made each day. Approximately 200,000 daily one-way trips are anticipated under full service conditions.
- Cost:** BART construction and equipment cost \$1.6 billion, financed primarily from local funds: \$942 million from bonds being repaid by the property and sales taxes in three counties, \$176 million from toll revenues of transbay bridges, \$315 million from federal grants and \$186 million from interest earnings and other sources.

March 1978

\*Sunday service began in July, 1978

## SUMMARY AND CONCLUSIONS

### Study Scope and Objectives

BART, the 71-mile Bay Area rapid transit system, serves San Francisco, Oakland, Berkeley, and their suburbs and was opened in five stages, with transbay service beginning in September 1974.

This report was prepared as part of the BART Impact Program, which is a comprehensive assessment of BART impacts on traffic flow, travel behavior, land use and urban development, the regional economy, institutions and life styles, public policy, and the environment. The report focuses on the impacts of BART on travel by the Bay Area's ethnic minority populations: Blacks, persons of Spanish heritage, and Asians.

### Minorities in the BART Service Area

For the purposes of this analysis, the BART service area is defined as the three BART District counties (Alameda, Contra Costa, and San Francisco) plus northern San Mateo County. This area is the catchment area for virtually all BART riders presently using the system. The area has a population of 2.6 million, 1.9 million of them aged 16 years and older. Of the total population, 32% are defined as minorities for the purposes of this report. Persons of Spanish heritage make up the largest group (13%), with Blacks next (12%). Among the remaining 7% is a substantial Asian population (mainly Chinese, Japanese, and Filipino).

This study focuses on two major concentrations of minorities: The city of Richmond, whose population is 51% black and 14% other minority; and the Mission District in San Francisco, whose population is 38% Spanish heritage and 20% other minority. Both areas are served by BART.

Within the BART service area there is a strong correspondence between low-income ethnic minority status and relatively high levels of transit dependence. Along with the inner-city white population of senior citizens, the low-income ethnic minority populations are among the most transit dependent within the service area.

Although BART was designed primarily to carry long-distance suburban commuters (who are predominantly white) to downtown San Francisco and Oakland, the BART lines traverse many



minority population areas. Approximately 76% of the service area black population and 67% of the Spanish-heritage population resides within a more immediate area around the BART stations, compared with only 59% of the white service area population.

Some Bay Area residents and transportation planners hoped that BART would improve the mobility of inner-city and inner-suburban ethnic minorities. In fact, BART has not made a noticeable impact upon the mobility of ethnic minority residents. In particular it has had very limited impact upon the mobility of low-income central city minorities. This report addresses the actual use of BART by ethnic minorities and the reasons for apparently lower-than-hoped-for use of the BART system by the minority populations.

Ethnic minority use of BART has been researched in this study through the use of both quantitative surveys and qualitative research techniques. The research approach combines the study techniques of "conventional" travel surveys with a participant-observation method called "field station" research. Both types of research approaches have been undertaken to assure accurate representation of the attitudes and behavior of low-income ethnic minority persons (who are often underrepresented or inaccurately represented by conventional travel survey research).

#### Conventional Travel Survey Research

The conventional travel survey approach relies primarily on two surveys within the BART service area:

- (1) 1976 BART Passenger Profile Survey. This is a large sample on-board survey of BART ridership. Survey results were weighted to compensate for lower response rates among ethnic minorities.
- (2) BART Impact Program 1975 Areawide Travel Survey. This is a random sample telephone survey of 1,000 households within the BART service area.

As evidenced by the generally lower response rates to the Passenger Profile Survey among minorities, conventional surveys have shortcomings when attempting to establish travel attitudes and behavior among minorities, particularly low-income minorities. Difficulties stem from alienation, suspicion of outsiders, problems of language usage among non-English speakers, and a politically based disinclination to participate in "government related" surveys.



## Field Station Research Approach

To supplement the conventional travel survey results and provide a richer source of information on reasons for BART use and non-use, a field station research approach was adopted. The field stations involved the use of native community residents, under the supervision of planners and social scientists, as participant observers within the Richmond and San Francisco Mission District communities over a period of 8 weeks.

The essence of the field station approach is that sympathetic community observers are more likely to gain the confidence of community respondents than are conventional researchers, particularly in low-income ethnic minority communities, because they can enter the world of beliefs and behavior of community residents. Researchers were trained in participant observation techniques, and the research was conducted under the supervision and with the counsel of qualified social science researchers.

"Stationary" and "roving" researchers were employed in both communities. In Richmond, a beauty shop with male and female clientele served as the stationary field station. In the Mission District, a local community center was the stationary observation post.

Research took place from October 1976 to January 1977. Approximately 160 interviews were conducted and analyzed. The field station approach was conducted over a shorter period than usual in this kind of research and encountered some problems. However, overall, it proved to be an effective technique and provided insights into minority travel behavior and travel-related attitudes that were not apparent from the conventional travel survey results.

## Minority Use of BART

**Socioeconomic Characteristics.** Overall, minorities use BART slightly less than their representation in the resident population of the area surrounding the BART lines and stations would suggest. Thus, BART apparently does not effectively serve the low-income disadvantaged black and Spanish-heritage populations. But comparison of the socioeconomic status of minority and majority BART riders suggests that BART does not serve the low-income white population of the service area effectively, either. Minority BART riders, like the majority, are generally well-educated, middle-income travelers employed in the Oakland and San Francisco central business districts. With the exception of Spanish-heritage persons, minority BART users have substantially the same incomes as white users.

Both minority and majority users of the system include a larger proportion of persons with household incomes under \$10,000 than does the areawide population. This largely reflects the relatively heavy use of BART by college age youth. BART's minority ridership contains a particularly high proportion of young people, both relative to the BART service area minority population as a whole, and relative to white ridership on BART.

Travel Characteristics. Patterns of minority use of BART do not differ significantly from patterns of majority use of BART with regard to trip purpose or the time-of-day distribution of trips. Most trips are to or from work, and are made in the peak periods. The distribution of destination stations for minority BART riders is also similar to that for majority riders, with emphasis on the downtown San Francisco stations, although there are expected differences in the distribution of origin stations.

The use of public transit as an access mode to BART is substantially higher among minority BART users. This reflects both a greater level of transit dependence among minority BART users and the presence of better quality transit alternatives in the principal minority residential areas.

Analysis of the previous mode of travel of BART riders shows that a greater percentage of minority persons previously used the bus than is the case among the white population. Again, this reflects both the greater transit dependence of minorities and the fact that inner suburban areas of higher minority population concentrations were well served by MUNI and AC Transit buses before BART (relative to the white outer suburbs).

Analysis of reasons given for BART trips which were not made at all before BART shows that the previous lack of transportation was a factor for a higher percentage of minority riders than for whites. This suggests that BART has increased the mobility of minorities more than it has for whites.

#### Factors Influencing Minority BART Use

Not surprisingly, factors influencing minorities' travel choices among BART, bus, and automobile are largely coincident with those of the population as a whole. Travel time, reliability, ease of getting to and from the station, and travel cost are the primary factors influencing mode choice decisions of both minority and majority travelers.

However, the field station research revealed some slightly different emphases among factors influencing ethnic minorities' mode choice decisions:

- Reliability of Getting to Work on Time. Given the generally lower status of minority workers in jobs and incomes, they are more likely to be bound by a fixed work schedule. As a result, low-income minorities tend to place particularly high importance on travel time reliability in choosing their travel mode. Many minority persons interviewed reported that BART is not reliable for their work travel and that they cannot risk the uncertainty of BART travel times to work.

- Cost. Cost considerations appear to be more important to minority area residents than to whites. This reflects both the generally lower incomes of minorities and the better availability of less expensive bus alternatives in minority residential areas. Many field station respondents reported that BART is not competitive when compared with the lower cost and more reliable MUNI and AC Transit bus services.

- Fear of the System. There appears to be more fear of riding BART among ethnic minority residents than among the population as a whole. This fear arises as a consequence of BART's history of technical failures and system unreliability, and from concerns about underground travel in the case of an earthquake. The greater fear among minorities seems to stem largely from hearsay rather than direct experience of riding BART.

- Language Barriers. For persons who speak little or no English, the need to read BART's signs, coupled with the automated environment, presents an obstacle to use of the system, particularly for the area's Spanish-speaking and Chinese-speaking populations. Language factors tend to increase a perception of the automated BART system as an alien, unfamiliar, and potentially threatening environment.

- Lack of Awareness. Among people interviewed within the Richmond and Mission District field station areas, there is very little awareness of BART as an alternative for most of the trips people want to make. BART is generally not widely regarded as an alternative, even for trips that it might serve. In contrast, within the predominantly white affluent suburb of Walnut Creek, for example, where 1 in 10 households use BART regularly, BART is present in the community consciousness of transportation alternatives, whether or not residents choose to use it.

● System Route and Alignment. The overriding factor in minority persons' non-choice of BART is that it does not go where they want to go. BART is a downtown-oriented system. Most low-income minorities in Richmond, for example, do not work in downtown San Francisco. Similarly, among the Spanish-heritage population of the Mission District, most persons have jobs in areas of San Francisco outside the central business district. In cases where the BART lines do traverse job locations away from the central business districts, inadequate bus feeder service limits BART use.

## Conclusions

Clearly, there is little BART can do to change the location of its track and stations, although improved bus feeders could perhaps effectively extend its service area. However, improvements in BART schedules and service will improve the mobility of ethnic minorities (as it will for the population as a whole). Improvements in BART system reliability will also improve the usefulness of BART, particularly for persons with fixed work schedules who presently cannot accept the variability in BART travel times to their work destinations.

The radial suburbs-to-downtown design of the BART system does not lend itself to the local-travel, blue-collar employment, and inner-city travel needs of minorities. BART was not designed to meet these types of travel needs and it should not be expected to serve them effectively. However, designers of future rail rapid transit systems (even if their fundamental design objectives are like BART's) should pay careful attention to detail in station location decisions and bus service to and from the stations.

Involving community residents (particularly in ethnic minority communities) in the planning of rail routes and feeder services is also important, both in the interest of identifying community travel needs, and as a way of overcoming the alienation from suburbs-to-downtown rapid rail systems which may exist in many ethnic minority communities.

Utilization of BART by ethnic minorities might be expanded through improvements in the public information and community information programs of BART within ethnic minority communities. Publicity directed at minority communities to overcome community alienation and concern about BART's technical design and operations might also enhance minority use of BART. In addition, more emphasis on providing Spanish-language attendants and signing in Spanish and Chinese in key BART stations would enhance the accessibility of BART within communities that have large non-English-speaking populations.

## I. STUDY SCOPE AND OBJECTIVES

### Research Scope and Objectives

General Objectives. The major objective of this study was to determine whether and how BART affects the travel behavior of local ethnic minority populations. The purpose of this report is to supplement the BART Impact Program's analyses of areawide BART travel impacts with special focus on travel by ethnic minorities and the ways their BART-related behaviors and attitudes compare with those of the majority white population. In the report ethnic minorities are defined as Black, Spanish-heritage, and Asian peoples primarily of low income status. Low-income persons are defined as having incomes below the mean income in the San Francisco Bay Area. This special study was motivated by several factors.

One factor was the argument that conventional, large-scale survey data collection efforts underrepresent or misrepresent ethnic minority respondents.<sup>1</sup> The cultural bias implied by large-scale, questionnaire surveys seemed to call for an alternative data collection approach to address ethnic minority respondents. It was reasoned that to ensure accurate analysis this method should minimize intrusion into the privacy and routines of minority communities and that it should offer a greater degree of flexibility for individual responses than that available in the application of pre-designed short answer survey forms. Thus, one objective of the present project was to develop and implement such an alternative data gathering approach.

Another factor was the physical proximity of minority communities to the BART system in combination with apparent low levels of minority ridership on the system. The BART service area includes major minority settlements, and BART stations or lines

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<sup>1</sup>See, for example, William L. Nichols II, "Sampling and Field Work Methods of the 1973-74 BART Impact Travel Survey," Survey Research Center; July 1974, 117 ff; and Susan Welch, et al., "Interviewing in a Mexican-American Community: An Investigation of Some Potential Sources of Response Bias," Public Opinion Quarterly, Spring, 1973, 118-26. A good summary of many of the reasons for a special focus on ethnic minorities within the BART Impact Program is presented by Chester McGuire in "The Special Study of Ethnic Minorities in the BART Impact Program," Metropolitan Transportation Commission, April, 1976.

occupy or traverse many of these areas. Moreover, while urban ethnic minority persons are traditionally users of mass rapid transit systems in other cities,<sup>2</sup> preliminary local surveys (e.g. BART Impact Travel Surveys I & II) indicated low levels of minority ridership of BART compared with area population statistics (see Chapter IV).

A related argument for special emphasis upon minority groups came from pre-BART projections and publicity suggesting that BART service would enhance the social and regional mobility of "transportation-disadvantaged" groups such as low-income persons (a socio-economic stratum which includes disproportionately high percentages of ethnic minority individuals) living in areas traversed by BART lines. A special data collection effort within ethnic minority communities offered the potential for explaining BART use and non-use among these groups.

The project is aimed to achieve three major goals:

1. To provide rich and suggestive travel behavior information from local ethnic minority populations drawn on these groups' own terms and without the cultural and informational biases implicit in large-scale survey data collection approaches;
2. To compare findings for these groups determined by means of these special data collection efforts with those provided by more conventional survey data; and
3. To determine BART's impacts upon the travel behavior of these groups in comparison with BART's impacts upon travel by the majority population at large.

Specific Research Issues and Questions. A number of different survey questionnaires have been designed and implemented within the BART Impact Program to gather information on specific items of relevance to the quantitative analysis of travel behavior. However, partly because of low levels of BART

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<sup>2</sup>See, for example, the Nationwide Personal Transportation Study, Automobile Occupancy, Report #1, by the U.S. Department of Transportation, and the Federal Highway Administration, April, 1972, Appendix C, p. 36, Table 7; and Transportation and Economic Opportunity: A Report to the Transportation Administration of the City of New York by the Regional Plan Association, January, 1973, especially Chapters III and IV.



use by ethnic minority residents, and partly because of the limited focus of inquiry underlying these research approaches, they fail to provide a holistic picture of the travel patterns and reasons for the transportation mode choices of ethnic minority residents of the Bay Area. A qualitative approach of research field stations was developed to allow for a data collection approach based on recording a holistic picture of the world and travel-related choices of ethnic minority residents. The field approach was designed to allow for the natural flow of conversation within a variety of minority community settings.

However, a basic research need remained for comparability between data findings and groups, insofar as possible within the goals of the qualitative approach. Therefore, the following research issues were formulated to focus data gathering upon issues which would be partially comparable to the findings and issues of the major quantitative travel studies of the BART service area. While we assumed it unlikely that every conversation would clarify each issue, field researchers were to focus upon gathering information on:

- BART's impacts on the mobility of ethnic minority persons. Ethnic minorities are defined as Blacks, Spanish-heritage and Asian peoples primarily of low income status. Low-income persons are defined as having incomes below the mean income in the San Francisco Bay Area.
- Travel behavior among these groups, including mode choices, origin and destination patterns.
- Characteristics of minority BART riders and non-riders.
- Attitudes toward BART and other transportation alternatives including minority vs. majority perceptions of what transit alternatives exist.
- Perceived and expressed travel needs of ethnic minorities (particularly insofar as they differ from the white majority).
- Attitudes toward BART's comfort, safety, convenience, and reliability.

#### Complementary Approaches: Quantitative and Qualitative Analyses

The study involved analysis of the Transportation System and Travel Behavior (TS&TB) project's quantitative findings and

comparison of those findings with special qualitative data gathered through "field station" research among ethnic minority groups. The quantitative data base provides the primary basis for comparing majority and minority group travel within the BART service area. Two special research field stations within the minority communities of Mission-24th Street in San Francisco and the Richmond community in the East Bay provide special insight into the travel-related behavior and beliefs of ethnic minority populations who may not be adequately represented by conventional quantitative research findings.

### Report Organization

The remainder of this report details study findings and discusses the research approach and techniques employed. The material detailed in the body of the report is presented in summary form at the beginning of the document. In addition, study conclusions and policy implications are outlined in the summary section. The body of the report is organized as follows:

- Chapter II describes the BART system, the area it serves, and the distribution of ethnic minorities in the area.
- Chapter III describes the rationale and methodology underlying the field station research in the San Francisco Mission District and Richmond.
- Chapter IV presents findings on the travel patterns of ethnic minority and majority populations.
- Chapter V discusses factors contributing to BART use and non-use by minority and majority populations.



## II. MINORITIES IN THE BART SERVICE AREA

### The BART Service Area and Its Population

The BART system lies primarily within the three counties of Alameda, Contra Costa and San Francisco, with a short extension into northern San Mateo County. The non-white population within the BART service area consists mainly of Black, Asian (here defined to include Chinese, Japanese, and Filipino persons) and persons of Spanish heritage. These are the three ethnic minority groups of primary concern to this study.

Table 1 displays each county's share of population, urbanized area and employment, while Table 2 shows ethnicity and income information by area.

#### Alameda County

- The city of Oakland contains 34% of the county population.
- Oakland and San Leandro are the major employment centers, with jobs in both the business and industrial sectors.
- The proportion of residents of all ethnic minorities (33%) is second highest (after San Francisco) among BART area counties, and the percentage of Black residents (15%) is highest.

#### Contra Costa County

- Land use is predominantly low-density residential.
- Much of the commercial development is in retail trade.
- The proportion of ethnic minority population (19%) is lowest among the BART area counties.

#### City and County of San Francisco

- Of the BART area counties, this is the most densely settled.

Table 1

DISTRIBUTION OF POPULATION, URBANIZED AREA, AND  
EMPLOYMENT WITHIN THE BART SERVICE AREA

County	1970				Percent of Total Employment
	1975 Population	Percent of Total Population	Urbanized Area (Square Miles)	Percent of Total Urbanized Area	
Alameda	1,089,900	42.3%	137	41.5%	36.9%
Contra Costa	582,800	22.7	136	41.2	13.6
San Francisco	672,700	26.1	32	9.7	42.1
Northern San Mateo <sup>a</sup>	228,600	8.9	25	7.6	7.4
Total	2,574,000	100.0%	330	100.0%	100.0%

a. Cities of South San Francisco, San Bruno, Brisbane, Colma, Daly City, Pacifica and Millbrae.

Sources: Population and employment: Provisional Series 3 Projections, Association of Bay Area Governments, March 1977.

Urbanized area: Series 2 Projections, ABAG/MTC Joint Planning Program, September 1974,

Abstracted From Travel in the BART Service Area, BART Impact Program Document

No. DOT-BIP-WP 35-3-77, Peat, Marwick, Mitchell & Co., September 1977.

Table 2

ETHNICITY AND INCOME INDICATORS BY COUNTY WITHIN  
THE BART SERVICE AREA

	<u>Alameda</u>	<u>Contra Costa</u>	<u>San Francisco</u>	<u>Northern<sup>1</sup> San Mateo</u>	<u>Total for BART Area</u>
ETHNICITY					
White	67.2%	80.7%	57.2%	76.0%	68.1%
Black	15.0%	7.4%	13.4%	2.4%	11.8%
Spanish- heritage	12.6%	9.3%	14.2%	16.5%	12.7%
Other <sup>2</sup>	<u>5.2%</u>	<u>2.6%</u>	<u>15.2%</u>	<u>5.1%</u>	<u>7.4%</u>
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%
AVERAGE ANNUAL FAMILY INCOME	\$12,340	\$13,778	\$12,507	\$13,446	\$12,814
PERCENT OF ALL FAMILIES WITH ANNUAL INCOME BELOW POVERTY LEVEL	8.1%	6.2%	9.9%	4.1%	7.8%

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<sup>1</sup>Cities of South San Francisco, Daly City, Colma, San Bruno, Milbrae, Pacifica and Brisbane.

<sup>2</sup>Approximately 80% of the population included in "Other" is of Asian origin (Chinese, Japanese, Filipino).

SOURCE: 1970 Census of Population and Housing.

Figure 1



Figure 2

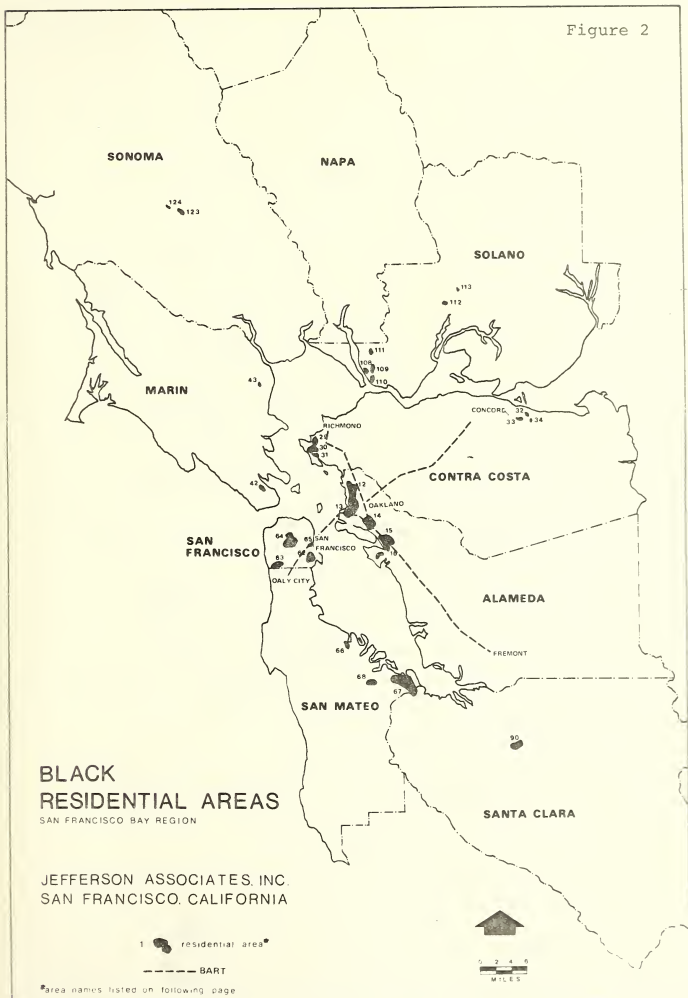
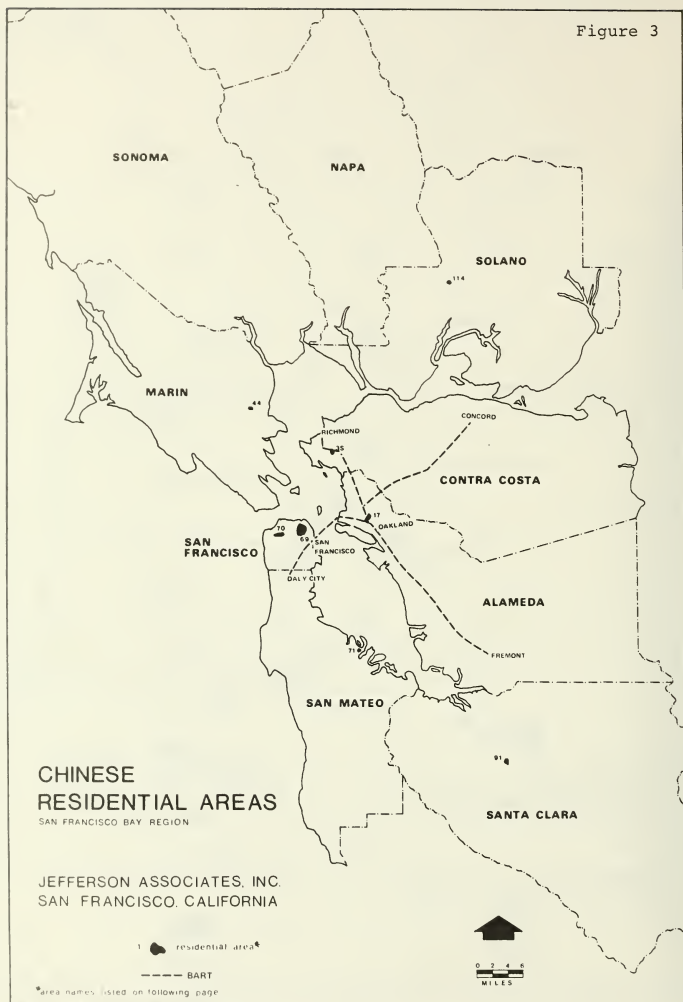
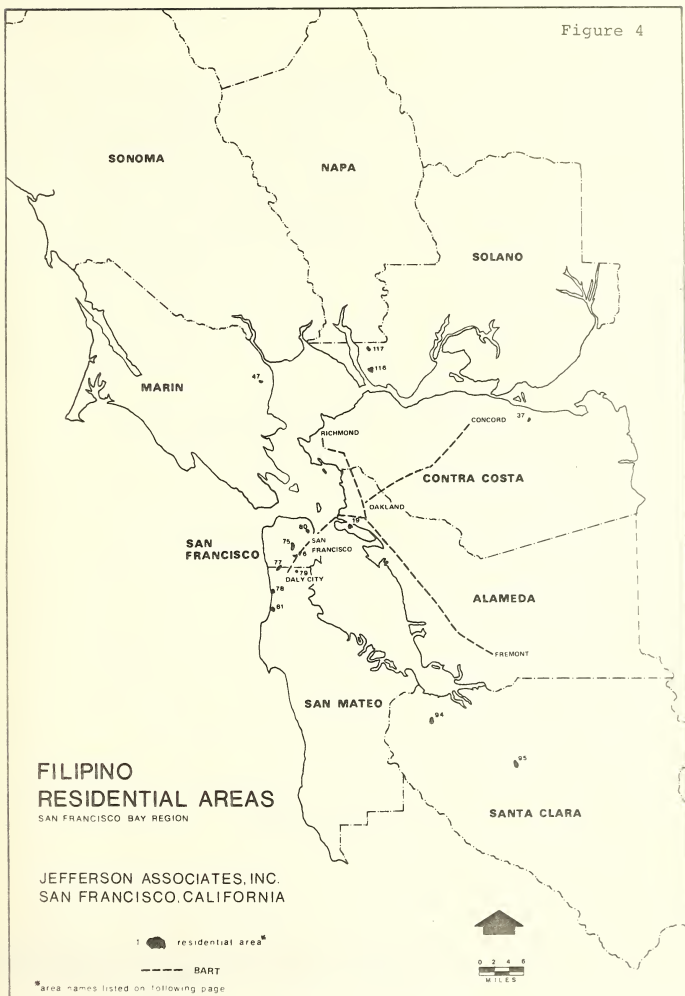


Figure 3



SOURCE: U.S. Bureau of the Census 1970

Figure 4



SOURCE: U.S. Bureau of the Census, 1970

Notes to Figures 1 - 4:

### Ethnic Minority Residential Area Clusters

- The ethnic minority residential areas identified in Figures 1, 2, 3 and 4 constitute areas of highest concentrations of specific ethnic minority populations. The areas contain concentrations of from 10 to 90% of the ethnic group identified in the figure headings. The identified areas are the most concentrated areas of residence of the ethnic minority populations. These data are abstracted from a comprehensive mapping of the ethnic minority population within the Nine-County San Francisco Bay Area Region.\* The numbers which appear on the maps in Figures 1, 2, 3 and 4 correspond to the following ethnic minority residential areas.

### Black Residential Areas (Figure 1)

- 12 - West Berkeley - Emeryville
- 13 - North and West Oakland
- 14 - Fruitvale
- 15 - Brookfield Village - Sobrante Park
- 29 - Parchester Village (Richmond Field Station Area)
- 30 - Iron Triangle (Richmond Field Station Area)
- 62 - Hunters Point
- 63 - Ingleside
- 64 - Fillmore - Western Addition
- 65 - Potrero

### Spanish-heritage Residential Areas (Figure 2)

- 1 - Fruitvale
- 3 - Alameda
- 4 - San Leandro West
- 5 - San Leandro East
- 6 - San Lorenzo
- 7 - Hayward
- 8 - Union City
- 9 - Newark
- 10 - Irvington
- 11 - Fremont
- 21 - San Pablo - Richmond Annex
- 22 - Hercules
- 52 - South of Market
- 53 - Inner Mission (Field Station Area)
- 54 - Outer Mission (Field Station Area)
- 55 - Bayview
- 56 - Daly City East
- 57 - Daly City West
- 58 - South San Francisco

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\*Phase I Final Report: Minority Transportation Needs Assessment Project, Metropolitan Transportation Commission Technical Report. Prepared by Jefferson Associates, Inc., November, 1977.



Chinese Residential Areas (Figure 3)

- 17 - Oakland Chinatown
- 35 - El Cerrito Hills
- 69 - Chinatown
- 70 - Richmond - Sunset

Filipino Residential Areas (Figure 4)

- 19 - Alameda
- 37 - West Pittsburg
- 75 - Inner Mission West
- 76 - Inner Mission South (Field Station Area)
- 77 - Outer Mission
- 78 - Daly City South
- 79 - Daly City East
- 80 - South of Market

- San Francisco is currently the area's employment center (followed closely by Alameda County), with a predominance of service-sector jobs in its business and financial districts.
- An overall decline in population since 1950 has been accompanied by an upward shift in non-white residents; its proportion of residents of all ethnic minorities (43%) is highest among BART area counties, with the highest proportion of Asians among its population as well.

#### Northern San Mateo County

- This area contains a mix of predominantly white residential and industrial areas.
- The proportion of ethnic minority population (25%) is relatively low, although this area contains the highest proportion of Spanish-heritage population among the BART area counties.

Distribution of Ethnic Populations. Settlements of ethnic minority populations are more concentrated around the BART line than is suggested by the population composition figures for the three-county service area. The Black and Spanish-heritage populations in particular are concentrated in the areas around the BART lines and stations. One-half of the three-county Black population and 40 percent of the area's Spanish-heritage population live in census tracts located wholly or partly within one-quarter mile of the BART lines and stations.<sup>3</sup>

Figures 1, 2, 3 and 4 show the geographical distribution of Black, Spanish-heritage, and Asian populations within the BART service area. These can be summarized as follows: Within Alameda County there are heavy concentrations of Black population in south and west Berkeley, Oakland, and the southern areas of Union City, Hayward, and southern Fremont. The county's Asian population resides chiefly in northwestern and western Berkeley and Oakland's Chinatown (near the central business district). The Spanish-heritage population is concentrated mainly in the Fruitvale district of Oakland and in the Southern Alameda County communities of San Leandro, Hayward, Union City, Newark, and Fremont. The vast majority of Contra Costa's ethnic minority

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<sup>3</sup>BART's Implications for the Transportation Disadvantaged: Environmental Issues, BART Impact Program Document NO. DOT-BIP-TM-Draft, Urban Dynamics Associates, October, 1977.

population resides in the Richmond area and northern parts of the county, while the recently developed eastern areas along the BART line are predominantly white, affluent, low-density bedroom communities for the business and financial districts of San Francisco and Oakland. The major concentration of Blacks in Richmond led to its selection as a field station site.

In San Francisco, Asian settlements cluster in and around the Chinatown and North Beach districts north of the downtown area, as well as in the outlying inner Richmond neighborhood area to the west. Black population centers are in the Fillmore-Western Addition area east of Golden Gate Park, in the southeastern district of Hunter's Point and in the southwestern Ingleside district. Spanish-heritage population is heavily concentrated in the inner and outer Mission Districts southwest of Market Street. Spanish-heritage population clusters are located as well in the northern San Mateo County cities of Daly City and South San Francisco. The Mission District was selected as a field station site for this study.

#### The BART System

Figure 5 depicts the 71-mile, 34-station BART system. Four BART lines radiate along major transportation corridors from the central Oakland section of the system: the Concord line (to the east), the Richmond line (to the north), the Fremont line (to the south), and the Daly City line (to the west). Each line roughly parallels a major freeway. Comparison with Figures 1 through 4 shows the locations of ethnic minority populations relative to BART stations. Stations situated in or near (within  $\frac{1}{2}$  mile) areas of concentrated ethnic populations are listed below.

##### Near black communities:

Richmond, Ashby (Richmond line);  
12th Street Oakland, Fruitvale  
(Fremont line)

##### Near Spanish-surname/language communities:

Fremont, Hayward, Union City, Fruitvale  
(Fremont line); 16th/Mission, 24th/Mission,  
Daly City (Daly City line)

##### Near Asian Communities:

Powell (Daly City line); Lake Merritt, 12th  
Street Oakland (Fremont line); Downtown Berkeley  
(Richmond line)



BART began limited operations in the East Bay (Fremont-Oakland) in fall 1972; the current operation status was reached in fall 1974 with the beginning of transbay service. Direct round-trip service is currently available from Fremont to Daly City, Concord to Daly City, and Fremont to Richmond. In addition, one train per day runs in each direction between Richmond and Daly City to serve a major federal office installation in Richmond. Although direct Richmond-Daly City service is planned, journeys between these points currently require a transfer at one of three Oakland stations.

Service is operated along all lines from 6:00 a.m. to 6:30 p.m., Monday through Friday. Evening service between 6:30 p.m. and midnight is available on the Richmond-Fremont and Concord-Daly City routes, making it possible to reach all BART destinations from transfer stations in Oakland. Saturday and Sunday service were not operating until after this study was completed.

#### Other Transit Services within the BART Service Area

Transit Alternatives. There are two main operators of local transit services within the primary BART service area. The Alameda-Contra Costa Transit District (AC Transit) provides bus service in the East Bay counties where BART is located and operates numerous bus routes across the San Francisco-Oakland Bay Bridge to the transbay bus terminal on the edge of downtown San Francisco. The Municipal Railway of San Francisco (Muni) operates a comprehensive network of bus, trolley bus and streetcar service within San Francisco.

BART Feeders. Some feeder bus service is provided to all BART stations, although in some cases the frequency of feeders and the hours of their operation appear to fall short of demand.<sup>4</sup> The central city and inner suburban areas where most minorities live are generally much better served by bus and/or street car service than the outer suburban predominantly white areas. AC Transit operates most of the feeder bus service in the East Bay. Local AC Transit buses connect with many of the East Bay BART stations, and, under contract to the BART District, AC Transit operates "BART Express Bus" service to and from portions of the BART District beyond the immediate service area of BART stations.

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<sup>4</sup>Impacts of BART on Bay Area Institutions and Life Styles, BART Impact Program Document No. DOT-BIP-FR 10-6-77, Jefferson Associates, Inc., October 1977.

In addition, city and privately operated bus systems serve the Walnut Creek, Union City, Berkeley, Fremont, and Richmond BART stations.

- In the West Bay, the San Francisco Municipal Railway system runs feeder services to all nine BART stations. The San Mateo County Transit District (SamTrans) provides bus service between the Daly City station and points in northern San Mateo County including Daly City, San Francisco International Airport, San Bruno and South San Francisco. Several small shuttle buses also provide service to the Daly City station from nearby apartment and townhouse complexes. Privately-owned mini buses operate a "jitney" service on Mission Street between downtown San Francisco and Daly City, closely paralleling BART.

Travelers using Alameda-Contra Costa County Transit or the San Francisco Municipal Railway to connect with BART pay only half the normal round-trip bus fare.

### III. THE FIELD STATION APPROACH

#### Advantages of the Field Station Approach

One advantage of the field station research method (as adopted in this study), is that, unlike conventional survey research, which interrupts the milieu of the interviewees, life can be viewed as it is being lived. It is therefore less likely than is survey research to misrepresent those people interviewed. Categories introduced through questionnaires are likely to be somewhat foreign to the understanding of low-income and ethnic minority people, particularly among minorities who are not native speakers of the English language, and survey findings may not reflect an accurate understanding of the questions being asked.

A working assumption of the field station approach is that there exists a network of communication and beliefs within ethnic minority communities that partially determines and supports attitudes and behaviors of these residents. Through the use of sympathetic community-based informants, the field station approach is designed to enter this network of communication and belief through observation and interviews within the "natural setting."

#### Criteria for the Selection of Field Station Sites

The two chosen field station locations, the Mission District in San Francisco, and the Richmond community in the East Bay, were selected on the basis of research criteria established after preliminary field investigations. The selection criteria reflect a research interest in settings with concentrations of low-income ethnic minority populations, the likelihood of BART influence, and a village or community center to facilitate the participant observation research approach. The research criteria for site selection included the following requirements:

- Low income areas-

The research areas shall include high percentages of low income populations. Low incomes were operationally defined as below median incomes for the region in the 1970 Census. The percentage of families with incomes below poverty level also served as an indicator of an area's low income status.

- High concentrations of ethnic minority residents -

The area(s) should include high concentrations of ethnic minorities present in the San Francisco Bay Area: Blacks, Spanish heritage or Asians. High concentrations of ethnic minorities are operationally defined as area percentages significantly greater than the proportional representation of these groups within the BART three-county service area.

- A Local Community Center -

The areas should possess a local community - village center as a primary locus for informal discussions and observation.

- BART ridership -

The areas should possess sufficient levels of BART ridership so that BART related attitudes and behavior would form a part of the community's travel-related behavior and beliefs.

- Limited Auto Availability -

The community population must possess a limited degree of auto availability. The primary indicator of transit dependence was the BART 1976 Passenger Profile Survey (PPS) data on auto availability for the trips made on BART.

- Differentiated Types of Commercial Development -

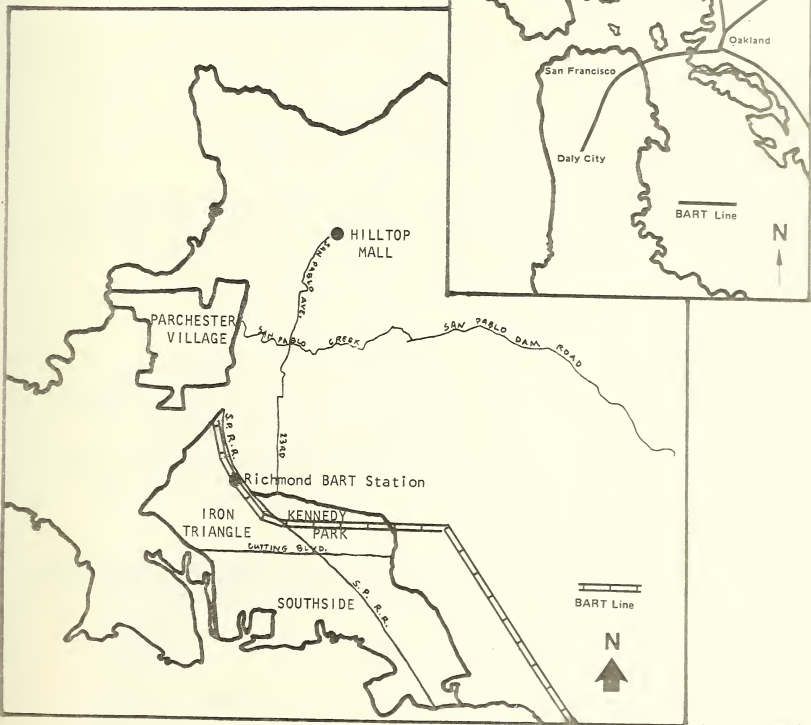
Communities with different types of commercial development within their boundaries will be selected.

Study Areas in Richmond, California. The selected study areas of Richmond, California, as shown in Figure 6 are locally known as the "Iron Triangle," Kennedy Park, Southside, and Parchester Village, have dense concentrations of Black residents, with low incomes and low auto availability as determined by the BART Passenger Profile Survey. Table 3 presents ethnicity and income indicators for residents in these areas compared with BART service area totals. The study area boundaries are depicted in Figure 6 (which also shows the location of the Richmond BART station). Blacks represent 51% and Spanish-American 9% of the population within these areas.



Figure 6

RICHMOND FIELD STUDY AREAS



Of the Richmond study areas, people in the "Iron Triangle" area live closest to the BART station; the greater Richmond area is also served by Alameda-Contra Costa County Transit and major highways. Although Richmond shops and businesses are less clustered than those in the San Francisco Mission District study areas, it was not difficult to locate a community identity center to serve as the field station. The selected field station was a busy hair stylist's for men and women which also served as an informal gathering place, and where a residential-employee was advantageously located to become involved as a participant-informant in informal conversations with a variety of clientele.

The Mission District, San Francisco, Study Area. The selected study area in the Mission District of San Francisco encompasses the 16th Street and 24th Street BART stations, and features one of the BART service area's heaviest concentrations of people with Spanish surnames and who speak Spanish. The Mission study area boundary is depicted in Figure 7, while Table 3 compares the ethnic composition and income characteristics of this population group with that for the BART Service Area. Within the study area, 38% of the population is Spanish American, 7% Black and 13% "other" non-white.

The Mission District is served by San Francisco Muni buses in addition to BART. Its visible, centralized village of shopping and services extending along 24th and Mission Streets offered a variety of potential field stations, and a Neighborhood Center serving a broad spectrum of the local population was selected as the stationary post for field data gathering.

### Setting Up A Community Field Station

A field station for community interviews and observation represents a new research methodology for the study of community travel behavior. While the approach is similar to long-standing research methodologies in the area of anthropology and urban ethnography it is a novel method for contemporary travel behavior research. The discussion which follows describes some of the methods and operational techniques which are distinctive features of the field station methodology, as applied in the two case study settings.

Identifying the Key Field Work Area: Community Surveillance. Prior to setting up a field station operation, senior researchers undertook community surveillance and monitoring of the prospective

Figure 7

MISSION DISTRICT FIELD STUDY AREA

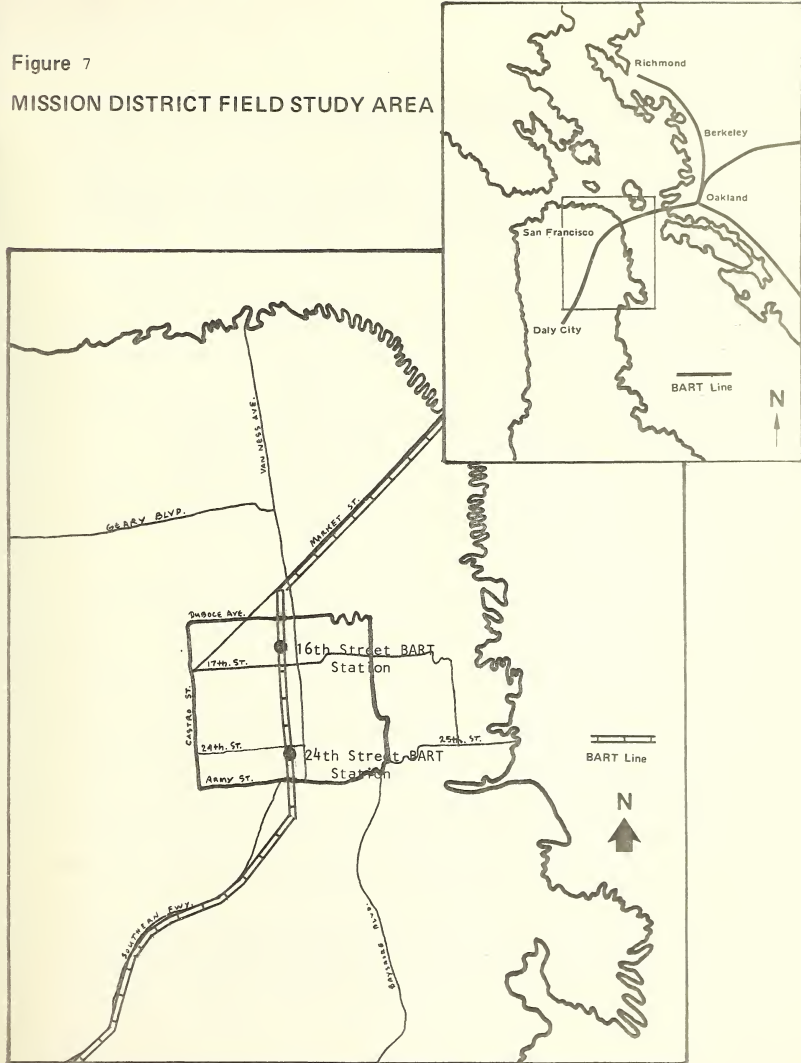


Table 3

SOCIOECONOMIC CHARACTERISTICS OF POPULATION IN  
SELECTED FIELD STUDY AREAS

	<u>Richmond Field Study Area<sup>1</sup></u>	<u>Mission District Field Study Area<sup>2</sup></u>	<u>TOTAL BART Service Area<sup>3</sup></u>
<u>ETHNICITY</u>			
Black	50.9%	6.9%	11.8%
Spanish surname, language, mother tongue	8.7%	37.9%	12.7%
Other Minority	4.9%	12.6%	7.4%
White (excluding Spanish surname, language, mother tongue)	35.5%	42.6%	68.1%
TOTAL	100.0%	100.0%	100.0%
<u>AVERAGE ANNUAL FAMILY INCOME, 1969</u>			
	\$9,954	\$9,264	\$12,814
<u>%FAMILIES WITH INCOME BELOW POVERTY LEVEL</u>			
	13.9%	14.4%	7.8%

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SOURCE: 1970 Census of Population and Housing, P-1, P-2 and P-4 Series.

<sup>1</sup> Census tracts included in Richmond study area are 3650, 3760, 3770, 3790, 3800, 3810, and 3820.

<sup>2</sup> Census tracts included in Mission District study area are 169, 201, 202, 203, 206, 207, 208, 209, 210, 211, 214, 228 and 229.

<sup>3</sup> Alameda, Contra Costa, and San Francisco Counties plus the northern cities of San Mateo County: Daly City, Colma, South San Francisco, San Bruno, Pacifica, Brisbane and Millbrae.

areas of research. This initial monitoring activity was accomplished through a walking and driving survey through potential research sites within the chosen communities. Scouting the areas in this manner allowed the researchers to verify that the areas chosen met the selection criteria established earlier. This initial survey also helped researchers to locate potentially rich data entry points<sup>5</sup> and to make initial field observations. The survey provided the basis for preliminary contacts with potentially sympathetic community based informants.

Field Operation Requirements. Further preliminary observation was employed to enable identification of the field operation requirements for the research of travel-related attitudes and behavior within the two settings. Several requirements were identified at this stage in the field activity:

- To hire at least four sympathetic community-based informants who spoke the language of potential respondents and had friends and community ties within the communities. Language was particularly critical in the Mission-24th Street area since most of the potential respondents spoke Spanish and very little English.
- To hire persons with a knowledge and familiarity with formal and informal activities within the setting. Formal activities are the public purposes of specific social settings or organizations, i.e. a beauty shop exists to provide beautician services, a park exists for recreation and social gatherings, etc. However, particularly within settings with an active social life, there are likely to be informal or unacknowledged social agendas which occur within these settings. Gaining entry into the informal world of activities and meanings was expected to require membership status within the social settings.
- To hire at least two field researchers who met both of the above criteria, one to have a stationary research position within a community

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<sup>5</sup>A data entry point is a public setting or social entity (clubs, organizations, work locations, etc.) where interactions may be monitored and/or key informants may be contacted to obtain information about community behaviors and beliefs.

meeting place and the other to be a roving researcher who would travel throughout the community observing and interviewing community residents, and following up contacts made by the stationary field researcher.

- That the community researchers hired be of the same ethnic groups as the potential respondents in the target communities.
- Ideal community informants are persons with both native community ties and some professional academic research training in the writing of research field reports. This provides some insurance against informants who lose the necessary outside perspective of the analytic observer of community behaviors and beliefs.

Training of Field Workers. Field workers were trained in the theory and practice of participant observation techniques. All personnel received training in their research objectives, time schedules, and required techniques for making written notes on their field observations and interviews. Research instruction also required a stage-by-stage consultation with field workers to assist them in recording the narrative of their field experiences while sensitizing them to the analytic objectives of the research.

#### Data Collection Activity: Stationary and Roving Observers

Data collection for both Richmond, California and Mission-24th Street, San Francisco, areas lasted some eight (8) weeks, during the period from October, 1976, through December, 1976. In each area, one stationary field worker interviewed and conducted observations from a stationary observation post. For Richmond the post was located in Taylor's Beauty Salon (14th and MacDonald Avenue), which serves both male and female clients. In the Mission-24th Street area the chosen post was the Mission Neighborhood Center located at 362 Capp Street. In both posts the field workers came in contact with a broad spectrum of the local population in the selected areas, both in and out of the normal working hours.

Stationary Field Workers. The stationary field workers conducted interviews and observed people who visited the observation posts. As community residents came to the field workers' stations, conversations arose about BART and other

methods of transportation. However, in many cases the worker had to introduce these subjects with single individuals or small groups of people. Sometimes dialogues were conducted over several days with the same respondents, according to the respondents' daily routines. For example, stationary workers often saw the same respondents dropping their children off at the day care center or having their hair done at the beauty salon. In a few cases, these stationary field workers also followed up on contacts made through the initial respondent. Observations and interviews were conducted for at least eight hours a day over the eight week period, both in and out of the normal working hours.

Roving Field Workers. Two (2) roving field workers also conducted interviews and observations in the selected sites. One very important aspect for the Mission-24th Street team was that they speak Spanish. A major part of the field interviews with the Mission's Spanish-heritage population were conducted wholly or partly in Spanish.

The roving field workers went about normal routines in their respective communities, "hanging out" with different groups of individuals in a variety of settings or establishments: bars, community meetings, street corners, etc. The roving field workers also followed up leads from conversations with individuals they contacted, or occasionally followed up tips from the stationary observers. When the question of BART or public transportation did not arise "naturally" the question was raised by the roving field workers. At other times the workers would attend community meetings where they observed whether or not the question of public transportation came up. Sometimes while the community members were discussing community problems, the worker would introduce the question of BART or public transportation. Interviews were also conducted with community leaders about how they saw BART in relation to the community's transportation needs. From time to time the field workers would have field consultation sessions. Their field observation notes and comments with different respondents would be discussed. These notes, which included biographical data on respondents and comments made on BART and public transportation, were recorded by field workers at the end of each day. The Field Research Director received these notes at the end of the research period.

The Range of Field Station Contacts. The total number of field study participants was relatively small. A total of 76 interviews were formally reported; 30 came from the Mission District study area and 46 from the Richmond area. The difference in sample sizes between the two areas derives chiefly

from the highly politicized atmosphere pertaining in the Mission District area, and the comparatively greater difficulty of field study in this area. The age range of interviewees was between 15 and 80 years; most participants were between 25 and 40. Table 4 shows the ethnic mix of interviewees in each study area.

Table 4  
FIELD STATION INTERVIEWEES, BY RACE

<u>Ethnicity</u>	<u>Richmond Study Areas</u>	<u>Mission District Areas</u>
White	1	1
Black	45	1
Spanish-surname	—	28
TOTAL	46	30

Field workers also talked more informally with more than an equal number of persons. Although these conversations were not separately reported, their content contributed to the nature and analysis of the field findings. In sum, field workers spoke with an estimated 160 persons overall.

Issues of Reliability and Validity in the Field Research Setting. The first issue is the research problem of establishing the reliability of field data. Many observers of racial minorities within their communities have pointed out the difficulty of obtaining reliable impressions of the attitudes, beliefs and behaviors of minority residents. Field research personnel were concerned with the practical problem of ascertaining when someone is "running a game" on the researcher as compared to giving a sincere expression of his or her attitudes, beliefs and behaviors. "Running a game" is operationally defined here as the act of telling the researcher (or outsider) what the respondent thinks the interviewer wants to hear or of fabricating false reports. Researchers in ethnic minority communities have pointed out this method of communication as a technique of dealing with outsiders who may be identified as a potential threat to insider community members. In a transportation research study,



the outsider status of the researcher is confirmed in part by their asking questions which seem out of the ordinary for usual conversation. The interviewers were instructed to check the responses of respondents over time where doubts about the reliability of a respondent's reports did occur. However, in the end the only methodological warranty for the reliability of the field interview and observational data is the sensitivity and astuteness of the field researcher in determining when he or she is being deceived or "put on

The second issue concerns the problem of generalizing from observation and interview data, and of validating these generalizations. Researchers were instructed to double check information given during interviews, to look for patterns of response among those interviewed and to check interview materials against notes from field observations. Methods of checking for validity included asking other interviewees the same questions in a different context and, during group interviews, looking for disparities and similarities among the group members in their responses to the issues being discussed. Of course, the researchers were also asked to note consensus among members of the group around certain statements being made. Where trends were apparent in the responses of community members the same issues were raised with other members of the community, and their answers were compared with earlier observations. When areas of consistency appear in the statements and data trends among similarly placed persons, the validity of the findings has been supported. When events being discussed are historical, the researchers were able to consult local newspapers to attempt to verify statements. However, this type of check does not allow for the observed disjunction between the "objective" record and people's differing but valid perceptions of experiences and events. When doing this type of field research, it is the consistency with which certain attitudes continue to be expressed or behavior patterns continue to occur that leads one to conclusions about the validity of major research trends.

#### The Research Approach--How Well Did It Work?

The field station approach worked well as a methodological technique chosen to study travel behavior among ethnic minorities in the Mission-24th Street areas of San Francisco and Richmond, California. This method allowed us to accumulate travel behavior materials for populations who do not normally respond well to conventional survey techniques. In our particular case, we believe that the field station approach was effective because we were able to tap respondents who had never used BART trains before, or been in BART stations. Our technique allowed us to penetrate the ethnic minority communities

being studied, thus cutting down on the number of unsuccessful interviews. As well, the field station method allowed us to: (1) conduct interviews using the same categories of meaning already existing within the community, thereby lessening the possibility of misunderstanding between interviewer and interviewee; (2) talk to community leaders and other community people who are hostile toward BART; (3) reach and interview ethnic minorities who do not speak or read English; and (4) question and talk with people about BART without interrupting their daily routine (if any interruption occurred it was minimal -- many scholars have suggested that conventional survey research techniques are an interruption in the normal routine of people, and that foreign categories are often introduced -- our approach minimizes this problem). Our findings suggest that our research techniques allow us to collect personal and attitudinal data, which met our research objectives. The research findings when looked at through the field station technique, along with library research, census data, and a review of previously conducted survey research studies of BART make us believe that our findings are valid, useful, generalizable and representative of the areas studied.

A further difficulty was the time constraints under which the research was conducted. The study was carried out over a period of eight weeks. Most ethnic minority communities are very political in their feelings toward any type of research being done on their community that is not controlled by a locally-known group. As a result even local community residents sometimes have data collection problems, especially while attempting to contact leaders of the particular area. We believe that a longer research period would serve to minimize the distrust and suspicions from local community leaders and some community members, who are now asking questions about various incoming State, Federal and City programs, "Why do they want to know this information? Are they spying on local community groups for some agency outside of the community?" We faced these kinds of questions when we started our research in the Mission-24th Street area, and we believe that, had we not hired local community members it would have been difficult to carry out our research. A longer period of study and observation within the community would probably serve to lessen these sentiments of suspicion among community members.

What Difficulties Were Encountered? A major difficulty was the lack of salience or importance of attitudes and beliefs about BART and transportation relative to the primary interests and concerns of community members. Field participant observation is most effective when the focus of research inquiry parallels the interests and priorities of community members. Transportation

is a primary and essential link to daily urban routines but it is not a subject of reflection and concern unless or until something goes wrong, (e.g. in the case of a transit strike or car breakdown) in the midst of a person's daily routine. Another problem was the shortness of the training period for the field researchers. More training would have more effectively sensitized the field researchers to the actors' world, thus allowing us to get a more complete picture. The hiring of local community sympathizers helped to achieve this goal, but it must be remembered that the researchers were not trained social scientists. As well, more time for training would have allowed us to: (1) run a great number of "pre-test" interviews and observations within the selected communities; (2) familiarize the field researchers with their new role as social science researchers; and (3) recheck our observations and interviews gathered over a long period of time. Examples of good qualitative research, done over much longer periods of time are: Elliot Liebow's Tally's Corner and Herbert J. Gans' The Urban Villagers.<sup>6</sup>

In light of our experience and findings from this type of research, we believe this methodological tool (the field station approach) represents a good technique with which to do travel research among ethnic minorities, who are generally inaccessible through conventional survey research techniques.

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<sup>6</sup>Gans, H. The Urban Villagers: Group and Class in the Life of Italian Americans. New York: The Free Press of Glencoe, 1962.

Liebow, E. Tally's Corner: A Study of Negro Street Corner Men. Boston: Little, Brown & Co., 1967.



#### IV. TRAVEL PATTERNS OF MINORITY AND MAJORITY POPULATIONS

##### Areawide Travel By All Modes

The characteristics of BART ridership have been compared to the characteristics of areawide residents in another report of the TS&TB Project.<sup>7</sup> This chapter analyzes the patterns of travel by minorities in more detail. Tables 5 and 6 display comparisons based on the 1975 and 1976 BART Passenger Profile Surveys (PPS)<sup>8</sup> and the 1975 BART Impact Program Areawide Travel Survey, with data weighted to compensate for generally lower response rates among minority riders. While data sets from these studies are not entirely comparable because of sampling differences and dissimilar grouping within data categories, each reveals a pattern of BART ridership which is disproportionately white, young, and highly educated, although not affluent when compared to the population at large. In 1976 the proportion of non-white BART riders was slightly lower than the proportion of non-white persons areawide (28% vs. 32% areawide), as shown in Tables 5 and 7. The percentage of non-white bus/streetcar riders was lower than that of non-white BART riders (25% vs. 28%), and the percentage of non-white auto users was substantially smaller (about 13% overall).

While about 37% of the area's population in 1970 was between the ages of 18 and 34, 59% of BART ridership is shown to be between these ages (Table 5). Both auto users and bus/streetcar riders tend to be older (Table 6).

The proportion of BART riders with at least some college education is high in comparison to educational levels areawide. Table 7 shows that 80% of BART riders had completed at least some college, while only 31% of the area residents had done so. Among BART riders, incomes tend to be higher than among travelers using other transportation modes. As shown in Table 7, 30% of the BART riders have annual family incomes under \$10,000. Bus and streetcar ridership (Table 6) has a much greater proportion of riders making less than \$10,000 annually and a much smaller

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<sup>7</sup>Travel in the BART Service Area, BART Impact Program Document No. DOT-BIP-WP 35-3-77, Peat, Marwick, Mitchell & Co., September, 1977. Pp. 11-15 gives service area population characteristics, pp. 21-28 gives socioeconomic of BART riders and pp. 45-47 gives socioeconomic of travelers by all modes.

<sup>8</sup>The BART Passenger Profile Survey involved percentages calculated without including persons under age 16; only riders age 16 and older. Where possible, percentages for areawide census data were calculated over a comparable age range.

Table 5

SOCIOECONOMIC CHARACTERISTICS OF BART RIDERS, BY ETHNIC GROUP<sup>1</sup>  
(WEIGHTED PERCENTAGES OF RIDERSHIP SURVEYED  
BETWEEN THE HOURS OF 6:00 A.M. AND 3:00 P.M.)

	ASIAN	BLACK	SPANISH HERITAGE	WHITE	OTHER	TOTAL	1970 POPULATION IN BART AREA
<u>SEX</u>							
FEMALE	53.9%	56.6%	53.4%	43.8%	54.4%	48.1%	51.8%
MALE	46.1	43.4	46.6	56.2	45.6	51.5	48.2
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>AGE</u>							
16 TO 17	1.9%	3.0%	3.7%	2.1%	7.3%	2.4%	4.6%
18 TO 24	38.7	32.6	30.6	22.0	39.1	25.0	17.4
25 TO 34	35.0	37.4	32.5	33.7	33.1	33.8	19.4
35 TO 44	11.0	14.3	16.0	15.0	10.1	14.7	16.0
45 TO 54	10.0	9.8	10.3	13.3	6.7	12.5	16.6
55 TO 64	2.4	2.5	6.1	8.4	1.7	7.0	12.7
65 AND OVER	1.0	0.5	0.9	5.7	2.0	4.6	13.3
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
<u>EDUCATION LEVEL</u>							
LESS THAN HIGH SCHOOL	3.0%	5.2%	10.6%	4.3%	7.3%	4.7%	36.0%
HIGH SCHOOL GRADUATE	12.7	17.9	25.7	13.9	14.1	15.1	32.9
SOME COLLEGE	41.2	53.5	40.7	37.0	48.9	40.0	15.7
4-YEAR COLLEGE GRADUATE	21.6	12.0	12.4	18.1	9.5	16.8	15.4
MORE THAN 4 YEARS COLLEGE	21.4	11.4	10.5	26.6	20.1	23.4	
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0% <sup>2</sup>
<u>ANNUAL FAMILY INCOME</u>							
UNDER \$7,000	18.5%	24.5%	24.4%	18.5%	37.4%	19.4%	14.9%
\$7,000 TO \$9,999	12.4	19.0	18.9	10.5	17.0	12.5	9.1
\$10,000 TO \$14,999	19.3	22.1	23.7	17.9	16.0	18.6	18.2
\$15,000 TO \$19,999	15.3	13.1	14.0	14.5	7.7	14.4	35.9
\$20,000 TO \$24,999	17.6	9.4	10.4	15.6	8.4	14.9	
\$25,000 AND OVER	16.2	10.9	7.4	20.0	10.8	20.9	21.9
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0% <sup>3</sup>
<u>AUTO AVAILABILITY</u>							
Yes	53.3%	47.4%	51.2%	63.8%	48.3%	60.1%	77.1%
No	46.7	52.6	48.8	36.2	51.7	39.9	22.9
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0% <sup>4</sup>
NUMBER OF RIDERS REPRESENTED	5,611	7,548	3,941	48,497	1,202	66,799	
PERCENT OF RIDERS REPRESENTED	8.4	11.3	5.9	72.6	1.8	100.0	
UNWEIGHTED SAMPLE SIZE	562	716	407	5,789	668	8,142	
PERCENT OF TOTAL UNWEIGHTED CASES	6.9	8.8	5.0	71.1	8.2	100.0	

<sup>1</sup>SOURCE: 1976 BART PASSENGER PROFILE SURVEY. AREA-WIDE DATA ABSTRACTED FROM TRAVEL IN THE BART SERVICE AREA, BART IMPACT PROGRAM DOCUMENT NO. DOT-BIP-NP 35-3-77, PEAT, MARWICK & FITCHELL & CO., SEPTEMBER 1977, TABLES 2 & 3.

<sup>2</sup>POPULATION 25 YEARS AND OLDER.

<sup>3</sup>1969 CENSUS INCOME DISTRIBUTION ADJUSTED TO REFLECT THE CHANGE IN THE TOTAL U.S. INCOME DISTRIBUTION FROM 1969 TO 1975.

<sup>4</sup>COMPARATIVE AREA-WIDE AUTO AVAILABILITY DEDUCED FROM RESPONSE TO A QUESTION ASKING THE NUMBER OF AVAILABLE AUTOMOBILES.

Table 6

SOCIOECONOMIC CHARACTERISTICS OF PERSONS MAKING TRIPS ACCORDING TO TRAVEL MODE<sup>1</sup>  
(Total Trips Made in Vehicles per Seven-Day Week, May 1975)

ETHNIC CATEGORY	BART			Automobile		Automobile		Bus/ Streetcar		Total
	Driver <sup>2</sup>	Passenger	Streetcar	Driver <sup>2</sup>	Passenger	Driver <sup>2</sup>	Passenger	Driver <sup>2</sup>	Passenger	
White	72.2%	87.5%	84.7%	75.2%	85.5%					
Black	9.6	7.9	8.0	13.7	8.5					
Other	18.2	4.6	7.3	11.1	6.0					
	100.0	100.0	100.0	100.0	100.0					100.0
SEX										
Male	53.5%	55.4%	24.5%	49.9%	49.8%					
Female	46.5	44.6	75.5	50.1	50.2					
	100.0	100.0	100.0	100.0	100.0					100.0
AGE										
Under 25	26.8%	22.7%	32.7%	33.4%	32.7%					
25 to 44	49.5	43.6	29.1	29.7	49.9					
Over 44	23.7	33.7	38.2	36.9	17.4					
	100.0	100.0	100.0	100.0	100.0					100.0
ANNUAL FAMILY INCOME										
Under \$10,000	29.9%	28.5%	36.1%	57.2%	32.8%					
\$10,000 to \$20,000	37.0	50.0	48.3	34.6	47.8					
Over \$20,000	33.1	21.5	15.7	8.2	19.4					
	100.0	100.0	100.0	100.0	100.0					
Number of Trips Represented	588,000	23,912,000	5,365,000	3,537,000	33,402,000					
Percent of Trips Represented	1.8%	71.5%	16.1%	10.6%	100.0%					
Unweighted Sample Size <sup>3</sup>	9,698	1,558	415	237						

<sup>1</sup>Data abstracted from Travel in the BART Service Area, BART Impact Program Document No. DOT-BIP-WP 35-3-77, Peat, Marwick, Mitchell & Co., September 1977, Table 19. Based upon the 1975 BART Passenger Profile Survey (weighted) and 1975 Area-wide Travel Survey (weighted).

<sup>2</sup>Includes "other" modes, largely pickup trucks and other commercial vehicles.

<sup>3</sup>Number for BART represents trips made by respondents to the 1975 BART Passenger Profile Survey; numbers for auto and bus represent trips made by respondents to the 1975 Area-wide Travel Survey.

Table 7

SOCIOECONOMIC CHARACTERISTICS OF BART RIDERS AND AREA-WIDE RESIDENTS<sup>1</sup>

	1976 BART RIDERS	1970 POPULATION OF THREE COUNTY BART AREA <sup>2</sup>
<u>ETHNIC GROUP</u>		
WHITE	72.3%	68.1%
BLACK	11.3	11.8
SPANISH HERITAGE	5.8	12.7
ASIAN	8.8	7.4
OTHER	1.8	-
	<u>100.0%</u>	<u>100.0%</u> <sup>3</sup>
<u>SEX</u>		
MALE	50.8%	48.2%
FEMALE	<u>49.2</u>	<u>51.8</u>
	100.0%	100.0%
<u>AGE</u>		
16 TO 17 YEARS	2.2%	4.6%
18 TO 24 YEARS	24.0	17.4%
25 TO 34 YEARS	34.7	19.4
35 TO 54 YEARS	28.5	32.6
55 TO 64 YEARS	6.9	12.7
65 AND OVER	<u>3.8</u>	<u>13.3</u>
	100.0%	100.0%
<u>EDUCATION LEVEL</u>		
LESS THAN HIGH SCHOOL	4.3%	36.0%
HIGH SCHOOL GRADUATE	15.0	32.9
SOME COLLEGE	39.9	15.7
4-YEAR COLLEGE GRADUATE	17.3	15.4
MORE THAN 4 YEARS OF COLLEGE	<u>23.5</u>	<u>15.4</u>
	100.0%	100.0% <sup>4</sup>
<u>ANNUAL FAMILY INCOME</u>		
UNDER \$7,000	17.4%	14.9%
\$7,000 TO \$9,999	12.4	9.1
\$10,000 TO \$14,999	18.8	18.2
\$15,000 TO \$24,999	30.1	35.9
\$25,000 AND OVER	<u>21.3</u>	<u>21.9</u>
	100.0%	100.0% <sup>5</sup>
UNWEIGHTED SAMPLE SIZE	8,147	
NUMBER OF TRIPS REPRESENTED	66,800	

<sup>1</sup>DATA ABSTRACTED FROM TRAVEL IN THE BART SERVICE AREA, BART IMPACT PROGRAM DOCUMENT NO. DOT-BIP-WP 35-3-77, PEAT, MARWICK, MITCHELL & CO., SEPTEMBER 1977, TABLES 2, 3 & 4. SOURCES: 1970 U.S. CENSUS OF POPULATION AND HOUSING AND 1976 BART PASSENGER PROFILE SURVEY.

<sup>2</sup>INCLUDES NORTHERN PORTIONS OF SAN MATEO COUNTY.

<sup>3</sup>PERSONS OF ALL AGES.

<sup>4</sup>POPULATION 25 YEARS AND OLDER.

<sup>5</sup>1969 CENSUS INCOME DISTRIBUTION ADJUSTED TO REFLECT THE CHANGE IN THE TOTAL U.S. INCOME DISTRIBUTION FROM 1969 TO 1975.



proportion of riders with incomes over \$20,000. Incomes of car users approximate BART user incomes more closely, but proportions of users making over \$20,000 are still low in comparison to BART ridership. The figures reflect the fact that BART's greatest share of work travel is to the white collar employment center of Downtown-San Francisco.

### Travel on BART

- The proportions of Asians (74%), Blacks (70%) and Spanish-heritage (63%) BART riders between the ages of 18 and 34 are greater than among Whites (56%) (cf. 27% areawide). This reflects the greater use of BART by ethnic minority youth for school and work trips. It also reflects the relatively less attractive status of BART among older members of the ethnic minority communities.
- The proportion of Asian BART riders having at least some college education (84%) is highest, compared to 82% among whites, 77% among Blacks and 64% among persons of Spanish-heritage (cf. 31% areawide). In effect, minorities riding BART are not primarily lower income lesser educated people (with the relative exception of the riders of Spanish heritage), but rather are among the younger well educated segment of areawide population.
- Whites and Asians who ride BART have the largest proportions of family incomes over \$15,000 (50% and 49% respectively). The Black and Spanish-heritage groups have 33% and 32%, respectively, in this bracket (cf. 58% areawide). While percentages of non-white BART riders with incomes under \$10,000 are higher than the percentage areawide (31%-44% vs. 24%), this is also the case with white riders and is probably attributable to college and high school age youth ridership. The percentages of riders with middle range earnings (\$10,000 to \$14,999) among both white and non-white BART riders is near the areawide average, although slightly higher among Black and Spanish-heritage riders.
- Reports of auto availability for trips taken on BART is highest among white BART riders (64%).

Auto availability among ethnic minority BART riders is significantly lower: 53% among Asians, 47% among Blacks, and 51% among persons of Spanish heritage. This reflects, in part, the more urbanized character of the ethnic minority populations. Better quality bus and feeder service within the core areas encourages a reliance upon public transit while public transit is not a viable alternative in the outer suburban areas of high majority group ridership.

Non-white BART riders thus differ from white system users in the higher proportions of young riders and lower levels of auto availability among ethnic minorities. Also, Black and Spanish-heritage BART riders have substantially lower percentages of persons with incomes over \$15,000 than either whites or Asians. College education among all BART riders is at least twice as high as among the areawide population and considerably younger for all groups than the population at large. In general, we may conclude that BART carries minorities about equal to their incidence within the population, but carries disproportionately few low income and less-educated persons of all ethnic origins. In effect, while the minority BART riders have slightly lower incomes and lower levels of car availability than the white riders, they do not appear to be a low income disadvantaged segment of the areawide population.

#### Access to BART Stations

The 1976 BART Passenger Profile Survey shows that higher frequencies of ethnic minority BART riders use bus feeder access to BART stations, whereas white BART riders more often use car access. This is primarily explained by the fact that higher percentages of minorities live in urban and inner-suburban areas where better feeder bus service is available than in the outer (white) suburban areas. For all groups, females are more likely to use bus or car access to BART stations, while males are more likely to walk. Patterns of access by ethnic group (shown in Table 4) are highlighted below:

- Asian BART riders most often access BART by car (43%); the remaining 57% of Asian riders walk and use bus access in approximately equal proportions.
- Black BART riders access stations by bus and by car, with 35% using each mode; a slightly smaller proportion (29%) walk to BART stations.

- Among Spanish-heritage riders, BART stations are most often accessed by foot (41%) but are almost as likely to be accessed by car (38%). Among ethnic minority groups, they have the smallest proportion of members who access BART by bus.
- Among all groups, majority white riders least often (18%) use bus access to BART stations and most often use car access (49%); they are more likely than are Asian and Black riders and less likely than are persons of Spanish heritage to walk to BART stations. This data partially reflects the high concentrations of Spanish-heritage residential areas around the Mission Street BART stations. By way of contrast, Black and Asian ethnic minority settlements are more dispersed away from the BART stations.

Table 8

ACCESS MODES TO BART STATIONS BY ETHNIC GROUP

	<u>White</u>	<u>Black</u>	<u>Spanish Heritage</u>	<u>Asian</u>
Bus	18%	35%	20%	29%
Car (driver or passenger)	49	35	38	43
Walk	32	29	41	27
Number of trips represented	48,497	7,548	3,941	5,611
Percent of BART* trips represented	72.6	11.3	5.9	8.4

Basis: 1976 BART Passenger Profile Survey (weighted percentages of BART travel between the hours of 6:00 a.m. and 3:00 p.m.) and Travel in the BART Service Area, Table 15.

\*BART riders of other ethnicities account for 1.8% of trips, bringing total to 100%.

Trip Purposes. Patterns of daytime trip purpose among BART riders (see Table 9) do not correspond to travel purposes areawide. The proportion of work ridership on BART is more than double that areawide for all travel modes. Conversely, the percentages of BART trips for shopping and other purposes (including visiting, recreational and cultural uses, and personal business trips) are much lower than their percentages areawide. The highest proportions of auto travel (which accounts for a majority of all trip purposes areawide) occur in the categories of other purposes, work and shopping (in that order), while bus or streetcar travel is most often used for work, other purposes and school.

Table 9

TRIP PURPOSES OF AREAWIDE TRAVELERS BY MODE OF TRAVEL<sup>1</sup>  
(Total Trips Made in Vehicles on Weekdays, May 1975)

<u>Trip Purpose</u>	<u>BART</u>	<u>Automobile</u>	<u>Bus or Streetcar</u>	<u>All Modes</u>
Work	64.8%	26.2%	49.1%	29.5%
Business	5.6	7.3	3.5	6.9
School	13.1	9.9	18.8	10.8
Shopping	4.9	21.3	8.7	19.5
Other Purposes <sup>2</sup>	<u>11.6</u>	<u>35.5</u>	<u>19.8</u>	<u>33.3</u>
	100.0%	100.0%	100.0%	100.0%
Number of Trips Represented	588,000	21,463,000	2,629,000	24,680,000
Percent of Trips Represented	2.4	87.0	10.6	100.0
Unweighted Sample Size	9,698	1,445	192	

<sup>1</sup>Source: BART Impact 1975 Areawide Travel Survey; table abstracted from Travel in the BART Service Area, BART Impact Program Document No. DOT-BIP-WP 35-3-77, Peat, Marwick, Mitchell & Co., September 1977, Table 20.

<sup>2</sup>Includes recreation trips, trips to visit friends or relatives and personal business trips.

Patterns of BART trip purpose within ethnic groups appear to vary little from the overall BART ridership pattern. While the categories of trip purpose shown in Table 9 are not entirely comparable to those of Table 10, it is clear that most riders of all ethnicities use BART for the work commute. White riders are slightly more likely to use BART for business, personal business and other (largely recreational) purposes, while ethnic minorities (especially Asians) are more likely to use BART for going to school. This corresponds to the disproportionately high numbers of young riders among ethnic minorities. Data from the same source indicates that the greatest proportion of elderly riders (of whom few belong to ethnic minorities) use BART for personal business trips.

Table 10  
TRIP PURPOSES BY ETHNIC GROUP

<u>Trip Purpose</u>	<u>White</u>	<u>Black</u>	<u>Spanish Heritage</u>	<u>Asian</u>
Work	59%	62%	61%	57%
Business	4	2	2	2
School	10	15	12	21
Personal Business	12	8	13	12
Other	15	13	13	12
Percent of Trips Represented*	72.7	11.2	5.9	8.4

Basis: 1976 BART Passenger Profile Survey (weighted percentages of BART travel between the hours of 6:00 a.m. and 3:00 p.m.) and Travel in the BART Service Area, Table 5.

\*Other ethnicities represent 1.8% of trips.

Time Periods of Travel. Travel during the morning peak period (6:00-9:00 a.m.) amounts to 52% of BART travel between the hours of 6:00 a.m. and 3:00 p.m.<sup>9</sup> Analysis by ethnic category reveals some travel period differences among groups:

- White BART riders surveyed reflect the overall pattern (52% travel during peak hours vs. 48% off-peak);
- Black riders surveyed are slightly more likely to travel during peak hours (54% peak vs. 46% off-peak);
- Persons of Spanish heritage surveyed more often ride BART during off-peak hours (49% peak vs. 51% off-peak); and
- Asians surveyed are most likely to travel during the peak period (60% peak vs. 40% off-peak).

The data clearly suggest that with the exception of Asian BART users, ethnic minority travelers do not differ significantly from white riders in the time periods of their BART use.

#### Areas of Travel

At the time of the 1976 PPS, transbay trips constituted the largest segment of BART travel (42%, vs. 33% within the East Bay and 25% within the West Bay) and transbay travelers are statistically most likely to be well educated with incomes over \$15,000 annually.<sup>10</sup> Table 11 reveals differences in areas traveled among ethnic groups. Daytime Spanish-heritage BART riders are most likely to remain in the West Bay (along the corridor most highly populated by persons of Spanish heritage) and least likely to make transbay trips. White riders are the group most likely to make transbay trips, although relatively high percentages of Blacks and Asians also travel BART transbay.

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<sup>9</sup>Travel during the survey period (6:00 a.m. to 3:00 p.m.) amounts to 53.7% of all daily travel (6:00 a.m. to midnight). Source: Travel in the BART Service Area, BART Impact Program Document No. DOT-BIP-WP 35-3-77, Peat, Marwick, Mitchell & Co., September, 1977, Table 4.

<sup>10</sup>See Travel in the BART Service Area, Table 6.

Table 11

## AREAS OF TRAVEL BY ETHNIC GROUP

<u>Travel Area</u>	<u>White</u>	<u>Black</u>	<u>Spanish Heritage</u>	<u>Asian</u>
East Bay	33%	35%	30%	25%
West Bay	22	27	44	36
Transbay	45	38	26	39
Percent of Trips Represented*	72.7	11.2	5.9	8.4

Basis: 1976 BART Passenger Profile Survey (weighted percentages of BART travel between the hours of 6:00 a.m. and 3:00 p.m.) and Travel in the BART Service Area, Table 6.

\*Other ethnicities represent 1.8% of trips.

Trip Origins and Destinations

The highest frequencies of morning peak BART trip origins occur along the Daly City, Concord and Fremont lines. Along the Concord and Fremont lines, morning peak travelers include proportionately more whites than represented among BART riders of areawide residents, while the residential segment of the Daly City line shows greater percentages of non-white riders originating their trips on BART.<sup>11</sup>

When station origins of travelers are considered for each ethnic group (Table 12), it can be seen that the greatest proportion of white morning peak riders originate from stations along the Concord line, while the largest percentages of Black, Spanish-heritage and Asian riders originate from Daly City line stations. These figures reflect the large number of entries at the Daly City station. While the percentages of ethnic minority riders at other stations are considerably higher, these stations have relatively lower patronage volumes.

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<sup>11</sup>Source: 1976 BART Passenger Profile Survey.

Table 12

## TRIP ORIGINS &amp; DESTINATIONS BY ETHNIC GROUP

	White	Black	Spanish Heritage	Asian	Total % of Trips Represented
<u>Morning Peak Origins</u>					
Concord Line <sup>1</sup>	29%	5%	10%	12%	25%
Richmond Line <sup>2</sup>	14	8	10	11	11
Fremont Line <sup>3</sup>	23	27	27	18	23
Central Oakland <sup>4</sup>	7	20	4	12	8
Daly City Line <sup>5</sup>	23	33	47	37	27
Downtown San Francisco <sup>6</sup>	4	6	3	11	5
	100%	100%	100%	100%	100%

Morning Peak Destinations

Concord Line	4%	3%	4%	4%	4%
Richmond Line	10	11	9	10	11
Fremont Line	5	8	8	4	6
Central Oakland	22	15	20	14	18
Daly City Line	3	5	7	8	4
Downtown San Francisco	55	57	52	58	58
	100%	100%	100%	100%	100%

Daytime Off-Peak Origins

Concord Line	13%	3%	6%	6%	11%
Richmond Line	14	14	8	13	14
Fremont Line	15	16	19	13	16
Central Oakland	14	27	8	15	15
Daly City Line	16	14	39	20	17
Downtown San Francisco	27	26	19	32	27
	100%	100%	100%	100%	100%

Daytime Off-Peak Destinations

Concord Line	11%	3%	4%	3%	9%
Richmond Line	14	19	6	18	15
Fremont Line	12	18	20	12	14
Central Oakland	15	20	13	16	14
Daly City Line	10	14	23	20	13
Downtown San Francisco	38	25	33	30	36
	100%	100%	100%	100%	100%

<sup>1</sup>Concord, Pleasant Hill, Walnut Creek, Lafayette, Orinda and Rockridge stations.

<sup>2</sup>Richmond, El Cerrito Del Norte, El Cerrito Plaza, North Berkeley, Berkeley and Ashby stations.

<sup>3</sup>Fremont, Union City, South Hayward, Hayward, Bay Fair, San Leandro, Coliseum and Fruitvale stations.

<sup>4</sup>Lake Merritt, MacArthur, 19th Street, 12th Street and Oakland West station.

<sup>5</sup>Daly City, Balboa Park, Glen Park, 24th and 16th Street Mission stations.

<sup>6</sup>Civic Center, Powell and Montgomery stations.



The greatest percentage of white off-peak travelers enter the BART system from stations in downtown San Francisco; this is true as well for Asian riders. Spanish-heritage off-peak travelers are most likely to begin their BART trip from stations along the Daly City line in the West Bay and along the Fremont line in the East Bay, while Black off-peak riders originate in largest proportions from stations in downtown San Francisco and central Oakland, and from the Richmond line stations.

For all groups during morning peak and daytime off-peak travel periods, stations in downtown San Francisco are most often points of BART trip destinations. However, among travelers from East Bay Richmond line stations, a large proportion of riders begin and end their trips in the East Bay. This fact partially reflects the absence of direct Trans-Bay service from Richmond line stations. For example, Berkeley and downtown Oakland are the first and second most frequent trip destinations among BART travelers from Richmond. With the exception of East Bay travel among Blacks, minorities travel to the same primary destinations as the majority riders but there is a significant variation in their trip origins. More ethnic minority travelers begin trips from the urban and outer urban stations, while white travelers are more likely to come from origin stations in the suburban areas of the Concord and Fremont lines.

Previous Modes of Travel. Modes of travel used prior to BART for similar trips are shown by ethnic group in Table 13. Car travel (driving alone or in car pools) accounts for a majority of previous trips overall, and the car is the previous predominant mode among whites and Asians. The proportion of Blacks and Spanish-heritage BART riders who used the bus prior to BART is significantly higher than the proportions of previous bus users among white riders. This reflects the greater transit dependence of the ethnic minority populations. It is also likely that travel mode choices of minority BART riders partially reflect the fact that minorities live in areas where there was previous high quality bus service (which is not the case for suburban white BART riders).

Table 13

PREVIOUS TRAVEL MODES OF BART RIDERS BY ETHNIC GROUP<sup>1</sup>  
 (Weighted Percentages of Total Daytime Travel)

<u>Previous Modes</u>	<u>White</u>	<u>Black</u>	<u>Spanish Heritage</u>	<u>Asian</u>	<u>Number of Trips Represented</u>
Bus	39%	56%	53%	48%	20,600
Car	59	41	43	50	26,700
Walk/Other	2	3	4	1	1,200
Percent of Trips Represented*	72.7	11.2	5.9	8.4	98.2

<sup>1</sup>Includes only those travelers who made the same trip before BART.

Basis: 1976 BART Passenger Profile Survey (weighted percentages of BART travel between the hours of 6:00 a.m. and 3:00 p.m.) and Travel in the BART Service Area, Table 7.

\*Other ethnicities represent 1.8% of trips.

BART as an Access Mode for New Trips

Data from the BART Passenger Profile Survey (Table 14) suggest that BART may have enhanced the mobility of ethnic minorities--in the sense of allowing trips to be made--to a greater extent than among white riders. Between 9.6% and 13.8% of ethnic minorities, compared to 8.0% of white respondents, report that BART trips occur because BART provided a new transportation alternative where no previous means of transportation existed. However, this variation in reasons for new trips may also reflect the greater mobility of whites to suburban areas where no previous transportation mode exists with which to compare BART facilitated access.

Table 14

REASONS FOR NEW BART TRIPS<sup>1</sup>

<u>Ethnic/Racial Category</u>	<u>Moved into Area</u>	<u>Started Working in Area</u>	<u>No Previous Means of Transportation</u>	<u>Other Reasons</u>	<u>Total</u>
White	33.8%	36.2%	8.0%	22.0%	100.0%
Black	36.7	36.7	12.9	13.7	100.0
Spanish Heritage	25.7	41.1	13.8	19.4	100.0
Asian	35.8	36.2	9.6	18.4	100.0
Other	24.9	35.2	2.4	37.5	100.0

<sup>1</sup>Abstracted from Travel in the BART Service Area, Table 14.

Majority vs. Minority Group Travel Patterns

While the large-scale survey data reveal differences in travel patterns among BART riders by ethnic group, most of these differences are small when viewed in contrast to characteristics of the Bay Area population as a whole. The most notable differences among minority BART riders are in the area of auto availability (Table 5), in the related area of travel mode used before BART (Table 13) and in the higher percentages of riders between the ages of 18 and 34 and corresponding lack of elderly persons among minority riders (Table 5). Characteristics of travel behavior among Asian BART riders appear statistically to be most like those of majority white riders in nearly all areas studied, while travel patterns of the Spanish-heritage riders appear to be least like those of the majority. A corollary to this fact is the relatively low levels of BART ridership among residents in the areas of most concentrated Spanish-heritage residence along the Daly City line.



## V. FACTORS INFLUENCING BART USE BY MINORITY AND MAJORITY POPULATIONS

Although the survey findings presented in the preceding chapter indicate that ethnic minority persons are more transit dependent than whites, they also suggest that ethnic minority ridership of the new rapid transit system falls slightly below areawide proportions of these population groups. The field stations study of the Richmond and Mission District communities have revealed a number of factors which help to explain this apparent lack of BART ridership in the areas studied. These factors, each of which is a concern among some segments of the white population as well, are listed below:

- The reliability, convenience, and cost of BART as compared to those of other travel options;
- The geographic constraints of the BART line locations, especially the mismatch of BART's routes with expressed travel needs of ethnic minority communities;
- BART service limitations, in particular the interim service lack of weekend and late-night service and the lack of direct Richmond line service to San Francisco;
- Language barriers for persons who speak little or no English;
- A fear of riding BART related to its underground and transbay operations and its early record of technical failures, and
- A lack of community consciousness of BART as an effective transportation alternative.

### Reliability, Convenience and Cost

One of the major criticisms of BART among the minority communities studied was its unreliability in getting them to work on time. These comments, exemplified on the following page, frequently weighed BART in terms of travel time and cost, overall convenience and reliability against competing alternative transit modes.

As the occupational identification of some of the respondents suggests, most of the persons who had previously tried and abandoned

BART were not disadvantaged low income residents but were more likely to be members of the white collar central city work force from which BART draws the largest segment of its majority and minority riders.

A 24-year-old Black male optometrist reported long delays approaching the MacArthur Station where he had to transfer to the Daly City Line, and then a twenty minute wait for the train, making him an hour late for work on his first day on the job. Since then he switched to A.C. Transit, catching the bus two blocks away from home and riding direct to San Francisco with no transfers.

A 28-year-old Black housewife noted that one needed to allow excessive amounts of time to get to an appointment on time because BART is never on schedule.

A 31-year-old female told how she used to use BART to commute to work, but had to stop because she was always late for work. She said she could never depend on BART to make it through peak hour traveling; something always happened that caused a breakdown.

Although other studies (including TS&TB Project studies) have shown that concern with BART's reliability also plays a part in the majority group's transportation choices,<sup>12</sup> this concern has particular relevance for minority individuals. This point of view is represented by a Black male refinery worker. He felt strongly that:

BART is not for the working man, because it is unreliable and may cause him to be terminated from his job. He also described BART as a luxury for the middle class, and even told how his sister, employed by BART, was advised not to use BART as a means of transportation during training because it was unreliable.

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<sup>12</sup>See for example, Social Impacts of BART on Bay Area Families and Lifestyles, BART Impact Program Document No. DOT-BIP-TM Jefferson Associates, Inc., October, 1977 and the BITS-II and Areawide Travel Survey findings which follow. And: Explanatory Modeling of Transbay Travel Choice, BART Impact Program Document No. WP 34-3-77, Peat, Marwick, Mitchell & Company, October 1977.

Getting to work on time is apparently more critical for persons of ethnic minorities because of their historical relationship to the majority job market: they are often the "last hired and the first fired." Moreover, the position of ethnic minorities groups relative to others on the job and income ladders indicates that fewer of these workers hold the kinds of upper level and professional jobs which allow them to exercise discretionary control over their work travel times.<sup>13</sup> However, it is the relatively higher income, educated, minority commuter with a downtown work location who is more likely to experiment with using BART for the work commute.

Field study respondents frequently related their complaints about BART's dependability to its cost in relation to the cost and services of other public transit modes. This concern with cost and reliability in conjunction with travel times and schedules cut across income categories.

On the basis of the kinds of comments shown below, it appears that cost is a factor in respondents' non-use of BART as a work travel mode perhaps to a greater extent than for the whole majority population. Further increases in BART fares would be likely to decrease ridership of BART from these communities.

A 34-year-old Black engineer who works in San Francisco commented that he rode BART for several months back and forth to work but found it too expensive, and that it took longer to get to work; there was always a breakdown. He finally decided to use the bus, which proved faster, cheaper, and more reliable.

A 15-year-old Spanish-speaking student also concluded that BART costs too much. As a student, she said she gets a discount on the bus but not on BART, and she also noted that she couldn't depend on BART to be on time, while the buses were almost always on schedule.

Cost alone is not the deciding factor, however. The issue as expressed by field study respondents is that of cost in terms of services and dependability as weighed against competing

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<sup>13</sup>The Institutions and Lifestyles Project also found that regular BART commuters do tend to have discretionary control over their work arrival and departure times; see Social Impacts of BART on Bay Area Families and Lifestyles, op. cit.,

alternatives. As we have seen, ethnic minority persons generally use transit to a greater extent than the population at large, and they are already familiar and experienced with existing pre-BART public transit modes. Thus their expectations for BART may be pre-conditioned by the services and limitations of existing alternative transit rather than by the relative advantages and disadvantages of automobile commuting. The fact that more minority persons (including, as we have seen, some larger proportions of low income earners and youth) use BART for West-Bay-only trips is more likely a function of BART's availability and cost between West Bay points in comparison with the San Francisco Muni--the average West Bay BART trip costs 39¢ (excluding cost of getting to and/or from BART), compared with a Muni fare of 25¢, while the BART system's average fare is 75¢.<sup>14</sup> A similar argument applies when we find that lower income earning East Bay residents limit their BART trips to the East Bay, keeping their BART fares competitive with those of other carriers. In particular, the stations in minority community areas with higher percentages of youth ridership, i.e., Coliseum and Richmond, have relatively poorer alternative public transit service in terms of routes and headways than other areas. Thus, the high frequencies of BART use by these groups from these areas is not surprising.

The issue of BART's reliability has become controversial. However, the present lack of key measures for the reliability of BART service, such as average trip and wait times (and the standard deviations of trip and wait times), prevent an accurate assessment of BART's reliability to consider in the light of respondent complaints.<sup>15</sup> Available figures from BART's Vehicle Reliability Report<sup>16</sup> do indicate fewer train removals and car failures per revenue car hour during the first quarter of 1977 than were experienced during 1976, although the trend in passenger offloads due to equipment failures continues without noticeable improvement. Spot checks at selected stations, however, indicate that during the first quarter of 1977, BART trains exceeded their scheduled headways by 50% (that is, experienced delays half again as long as scheduled headways) only 10% of the time.<sup>16</sup>

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<sup>14</sup>Systemwide fare schedules, Source: BART Office of Research and Planning, April, 1977.

<sup>15</sup>BART Office of Research and Planning, April, 1977.

<sup>16</sup>See Social Impacts of BART on Bay Area Families and Lifestyles, Appendix A, for a fuller treatment of the Office of Research and Planning's reliability measures and findings.



Field station data collection activities were completed by January, 1977, and the larger scale attitudinal data was collected even earlier, so it remains to be seen how subsequent improvements in BART service will affect local ridership and opinion. Nevertheless, BART does continue to have problems with the reliability of its service, particularly on rainy days. Both the Institutions and Life Styles study of BART-using households and the TS&TB analysis of travel mode choice decisions for trans-bay corridor travel<sup>17</sup> suggest that areawide travelers do take account of BART's unreliability. In fact, among most regular users, BART's unreliability is viewed as a facet of the travel and wait times for journeys on the system. Regular users come to view BART travel time as a combination of the travel time under ideal service conditions and a safety or allowance factor for unplanned variability in the travel time due to system unreliability. This view of BART travel among the majority of areawide travelers appears to correspond in sentiment with the judgement of BART's unreliability made by ethnic minority residents when comparing BART travel time, cost, and reliability with the attributes of alternative access modes. However, both the field station research activities and the Institutions and Life Styles Project interviews with majority and minority group members suggest that there is a process of self selection in the response to BART's schedular unreliability problems. Some persons, particularly those with a fixed work schedule tend to "give up" on BART after experiences of variability in its travel time to their work destinations. Other persons go through a period of adjustment where they come to incorporate BART unreliability into their planning of their work trip. For these persons, the allowance factor for BART's unreliability becomes a regular facet of their work travel time. Apparently, minority community members within the two case study communities are less likely to go through the process of working through an adjustment to BART's unreliability, in large part because of the relatively more dependable and less costly transit service available from AC Transit or Muni for travel to major work destinations.

#### BART's Route Limitations for Minority Community Members

Responses from individual interviewees and community leaders indicates that BART's routes do not meet minority people's transportation needs. Community leaders, particularly within

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<sup>17</sup>Explanatory Modeling of Trans-Bay Travel Choice, BART Impact Program Document No. WP 34-3-77, prepared by Peat, Marwick, Mitchell, and Company, October, 1977.

the Richmond area, tended to resent the apparent fact that BART was not designed to serve inner-city residents but to carry Eastern Contra Costa County and Southern Alameda County suburbanites into the downtown financial districts in the morning and back to their homes at night.

Figures from the 1970 Census (see Table 15) provide evidence that BART routes do not correspond with the work transportation needs of a majority of the residents in the Richmond and Mission field study areas. Most Richmond workers remain in the East Bay and work in places not convenient to BART; levels of Central City employment are low. Of the Richmond workers in 1970, about 76% traveled to work in areas which may not be effectively served by BART (Contra Costa County, Alameda County other than Oakland, Oakland other than CBD and San Francisco other than CBD). While 23% of the Mission field residents in 1970 worked in downtown San Francisco, 56% worked in other San Francisco areas not served by BART.

Richmond residents in particular felt that the BART station could have been more conveniently located, or that BART service could have been (and should be) extended further into the Richmond areas of minority settlement. A specific suggestion was that BART connect with the recently developed Hilltop shopping area.

A 25-year-old Black female Richmond resident felt strongly that there should be a BART station located in or near Parchester Village, which she said was commercially and residentially isolated from the mainstream of Richmond. Her suggestion was seconded by a 70-year-old Richmond community leader, who suggested an extension of BART from 16th Street to North Richmond, Parchester Village, and even Pinole.

A 23-year-old Spanish-speaking mental health worker complained that BART does not travel into the outlying residential districts of San Francisco where many minority people live, such as Richmond, Ingleside or Hunter's Point areas.

The Institutions and Life Styles study (Jefferson Associates, 1977) found further evidence of perceived inadequacies in BART service to blue-collar employment centers. The West Oakland station, for example, would better serve the large concentration of ethnic minority factory workers, longshoremens and military personnel who work in the area had it been built two miles to the west of its actual site.

Table 15

## WORK TRAVEL MODES &amp; DESTINATIONS

	Richmond <u>Field Station Area</u> <sup>1</sup>	Mission <u>Field Station Area</u> <sup>2</sup>
Number of Workers	18,952	35,915
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Work Travel Mode		
Auto	81%	47%
Transit	10	42
Other	8	11
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San Francisco CBD	5%	23%
San Francisco Other	6	56
Oakland CBD	1	1
Oakland Other	11	1
Alameda County (Other than Oakland)	18	1
San Mateo County	-	7
Contra Costa County	41	-
Other	18	-

<sup>1</sup>Represents census tracts in MTC traffic zones 112, 116-118, 121.

<sup>2</sup>Represents census tracts in MTC traffic zones 379, 384-390.

Although ethnic minority respondents often feel that their transportation needs have been systematically ignored by BART planners--indeed, several openly resent the fact that they are taxed to support a system that they do not believe serves them and that their transportation needs and desires were not adequately studied or considered--majority group travelers are also concerned about problems of access to BART and the overall limitations of the fixed-rail system. In different suburban areas of the region, residents assert the need for direct San Francisco and Oakland Airport service, extensions of the present Fremont Line toward Pleasanton and Livermore or alternatively to the Santa Clara Valley employment centers around San Jose, and for a variety of other adjustments or extensions of the present routes. In general, both minority and majority expectations of BART are far beyond the potential capacity and range of service of a 71-mile fixed-rail system.

### Limitations in BART Service

The lack of direct service between Richmond and San Francisco under interim operating conditions is a source of inconvenience and delay for Richmond residents traveling transbay because of the need to change trains in Oakland. While this represents a temporary service condition, it has been perceived as an inequity by minority respondents. In light of reliable and less expensive AC express service to San Francisco from Richmond, the need to transfer becomes a deterrent to transbay travel via BART.

As among the White population, non-work trips by ethnic minorities are discouraged by the hours of BART operation under interim conditions (i.e., no late night or weekend trains). Interviews with Richmond BART riders revealed that many of those who use BART for work trips acknowledge the potential convenience of BART for shopping and leisure trips when weekend service begins.

In addition, minority residents who observe that BART is not reliable or cost competitive for work travel report, to a greater extent than among white suburban BART commuters, that they would like to use BART for recreational and leisure trips during the weekend. Some minority residents seem to make a more positive assessment of BART as a potential weekend recreational excursion mode; while suburban majority group members appear to view BART more positively for work travel but generally do not express a strong inclination to use it for weekend recreational outings.

### Patterns of Ethnic Minority BART Use: Richmond and Mission

Patterns of BART use from the Richmond and Mission stations tend to validate the qualitative findings from the field stations.

From the Richmond station, trips to all downtown San Francisco stations during the morning peak period comprise only 9% of the journeys (1976 PPS). From the five Concord Line stations from Concord to Orinda, 68% of the peak travelers go to San Francisco. In contrast, Berkeley is the destination for almost 1/3 of all Richmond peak travelers, reflecting the greater competitiveness of BART for Richmond line travel, in terms of cost (30¢) and time, while Berkeley is the destination of only 3% of the travelers from the five easternmost Concord Line Stations. BART patronage from the Mission 24th Street station reflects the more substantial place of the San Francisco CBD as an employment location for 24% of the Mission area residents. The three downtown San Francisco stations are the destination of 82% of the BART travelers from Mission-24th Street. Nevertheless, BART use among Mission residents is constrained by the relative importance of other San Francisco employment locations not served by BART and the relative lack of East Bay employment among Mission residents. Greater use of BART among Richmond area residents might be expected with improvements of BART reliability and the introduction of Saturday and direct Richmond-Daly City line service in 1978. Until that time travel by minorities in both communities is likely to reflect the relative non-competitiveness of BART service for travel from ethnic minority communities to their main employment destinations.

### Language Barriers

Respondents in the Mission District confronted language barriers which increased their difficulties in using BART, and thought BART should have all of its signs and informational literature printed in Spanish.<sup>18</sup> Enlistment of Spanish-speaking employees in all of the stations serving primarily Spanish-speaking residents was another suggestion. This goal has been implemented to some extent, in the BART station assignment policies. That the language barrier is closely related to cultural and psychological barriers is revealed in the following comments.

A middle-aged Spanish-speaking woman said she was afraid to try BART because she doesn't read English and can't even figure out how to get to a particular train. If they had Spanish-language signs, she said, she would use BART to travel downtown to shop without fear of getting lost.

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<sup>18</sup> While BART provides some informational brochures printed in Spanish and Chinese, these are not well publicized or effectively distributed, according to community respondents.

A 23-year-old Spanish-speaking woman pointed out that transferring between BART lines is complicated enough for English-speaking travelers; for Spanish-speakers, it can be hopelessly difficult.

Two key informants who head social service organizations for Spanish-speaking communities in Richmond also cited language difficulties which discourage BART use by their clients. According to the executive director of an employment service for the Spanish community, many clients speak only Spanish and are able to use BART only after developing a sense of direction and knowledge of the system through trial and error. This was corroborated by the director of the United Council of Spanish-Speaking Organizations, who stated that the non-availability of bilingual information combines with the characteristics of BART automation to discourage BART use among his client groups.

#### Consciousness of BART as a Travel Alternative

Among the ethnic minority members of the two case study communities BART is often not perceived as an alternative for trips that it might effectively serve. In white suburban communities such as Walnut Creek, where one household in ten uses BART, travelers may or may not choose to use BART for their journeys; however, they are conscious of its service as a travel option. In contrast, BART often does not enter the popular consciousness in minority communities as a travel alternative. Despite a general awareness of the whereabouts of BART lines and stations, field researchers most often had to introduce the topic of BART into the conversation, and they reported that many people had little to say about it beyond remarking that they didn't use it or that it just didn't go anywhere they wanted to go.

Within Richmond, where local bus service is limited, cars tend to dominate routine travel even for work-related trips. For those traveling to the business district of San Francisco, AC express bus service is considerably faster and more reliable than BART service, which requires a transfer and wait from Richmond line stations to transbay destinations. Moreover, the Richmond BART station is physically removed from the city's major residential areas and its main commercial area, so it is not likely to enter residents' consciousness even as an object of recognition.

Residents in the Mission District live in an urbanized neighborhood with essential goods and services available within walking distance

and with bus and jitney service available for travel to downtown San Francisco. Thus because of neighborhood character and familiar and effective transit options, Mission residents appear to be similarly unaware of BART as an alternative for their urban travel. BART is clearly not a routine feature of the consciousness of transportation options among ethnic minority residents in both case study communities.

### Fear of Riding BART

Many interviews revealed a continuing minority concern with safety and well-being while traveling on BART. In both the Mission and Richmond interviews, respondents volunteered opinions about the potential dangers of traveling on BART.

For example, a 25-year-old Black nurse revealed her fantasy of a big earthquake happening while she was in a BART train traveling through the transbay tube. She said the fantasy stays with her because of BART's reputation for accidents.

A 28-year-old Black female cannery worker had heard rumors that the transbay tube leaked. When she rode BART and the train stalled in the tube, she feared drowning.

A 35-year-old Black male postal worker from Richmond mentioned that he was in a BART car on fire at the Oakland West Station and decided then and there that BART wasn't for him. Watching that fire confirmed all his negative thoughts about BART, he said.

These three examples evidence a theme which arose in many interviews, particularly in the Black Richmond area population. These fears appear to derive in part from a lack of community experience with regular BART use: most minority persons are not regular users of BART nor members of households of regular users. The lack of direct exposure combines with community rumor and newspaper reports on BART breakdowns, accidents and technical difficulties to create a popular image of BART as a potentially dangerous conveyance. These doubts about BART's mechanical design and operations in turn combine with a fear of earthquakes within the Bay Area to create concern and trepidation about use of BART's subterranean line segments. Of course, concern about the safety of BART, particularly in the context of the earthquake danger, is widespread among other population



groups also. However, there is wide evidence to suggest it is a significant determinant of people's mode choice decision. Considerable research activity was focused on validating the extent of this fear of riding BART. Sympathetic community informants, who were themselves ethnic minority community members, were personally reluctant to conclude that minority persons are somehow afraid of new technology. However, re-interviews with earlier contacts and later contact interviews provided confirmation for this observed attitude through a consistent pattern of responses related to fear or apprehension about the safety of the system.

It should be noted that community fear of BART is not an unusual response to a technologically advanced transit operation which is regularly publicized as having continual mechanical problems. During the BART Impact Program's Institutions and Life Styles Project it was found that many of the fears expressed by minority respondents were initially shared by majority respondents. However, a process of repeated exposure to BART, directly and through the experience of family members and friends, caused them to redefine BART as relatively safe, and over time majority group members became desensitized to their rumor-based fears of the system. This process of socialization into acceptance of new technology has been an element of social responses to the automobile, airplanes, and to any significant new mechanical mode of transportation within the communities of their emergence.

In contrast minority members, who at present still have limited direct and vicarious experience of the system, were not caused to redefine their image of system safety. In effect, the expressed fears about BART within minority communities and among some elderly persons in concentrated elderly communities in central Oakland reflect the limited exposure of these groups to regular BART use.<sup>19</sup>

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<sup>19</sup>Three Community Case Studies, BART Impact Program Working Note, Jefferson Associates, Inc., September, 1977.





